Another new development using

B. F. Goodrich Chemical *raw materials*

Radiator cap made by Stant Mfg. Co., Inc., Connersville, Ind., using Hycar rubber seal molded by Acadia Synthetic Products, Chicago, Ill. B. F. Goodrich Chemical Co. supplies the Hycar rubber only.

NEW CAP KEEPS PRESSURE UNDER CONTROL

and Hycar helps!

HYCAR rubber even helps pressurized cooling systems operate efficiently now! For it has all the advantages needed to help the radiator cap pictured provide a perfect seal.

The manufacturer had to have a sealing material that would not stick to the brass radiator filler neck after long contact under spring pressure and heat or moisture. Sticking would prevent the control valve from opening under low pressures.

But that wasn't all. The material also must not swell, shrink, soften or harden under severe service. Hot and cold water, alcohol or chemical-based anti-freeze solutions must not affect it. Nor abrasion produced by fastening or removing the cap.

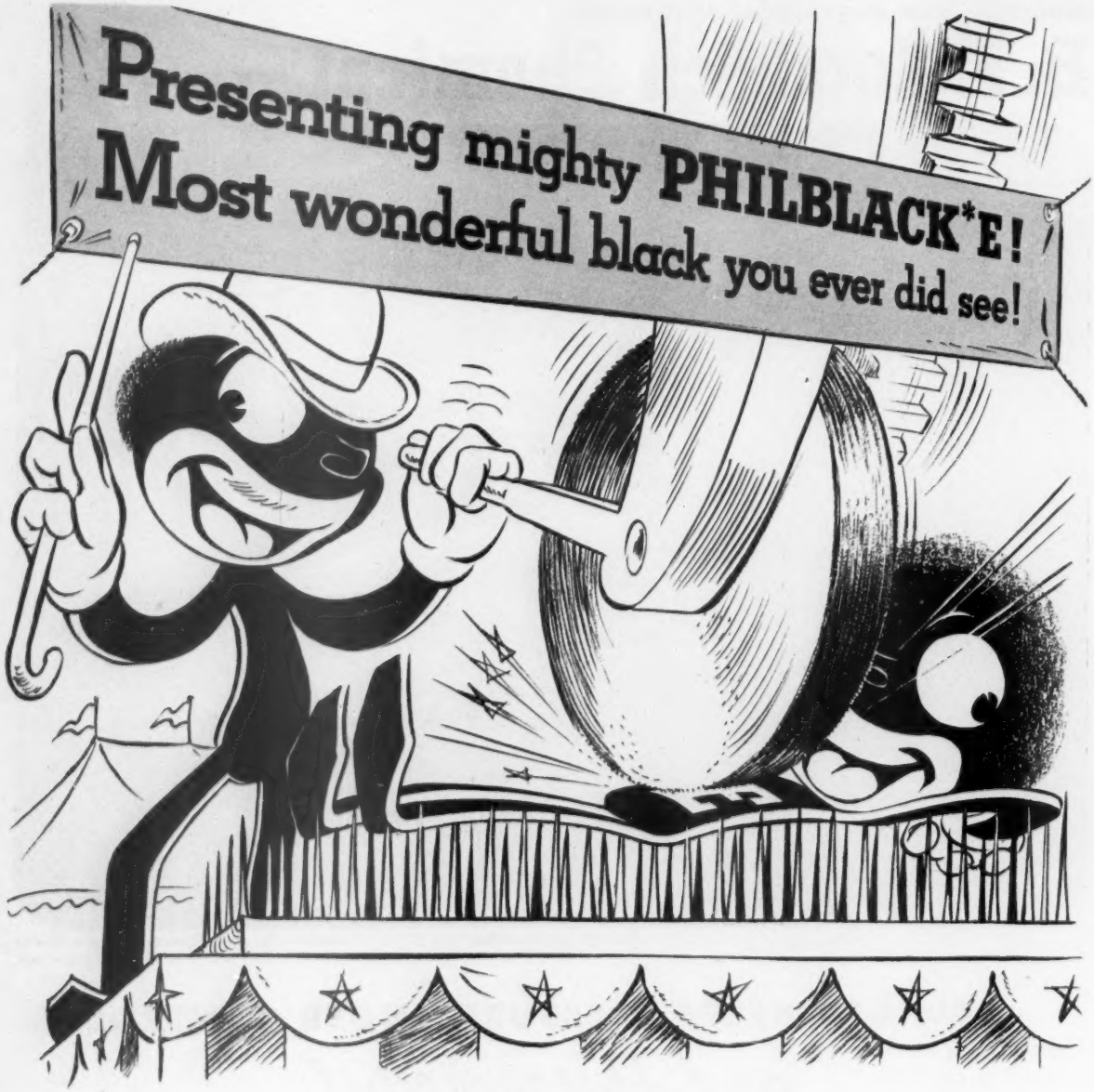
Hycar nitrile rubber provided the answer to every requirement. For Hycar resists extreme temperatures, oils, acids, many chemicals and abrasion. Its good compression set properties and resistance to cold flow further insure a perfect sealing action.

Hycar rubber compounds are used in many ways—to solve a troublesome problem, or help improve products to bring in more sales. Perhaps they can help you. For technical information and advice, please write Dept. HA-6, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar
American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors



Tire treads made with Philblack E surpass all existing records for mileage! Here's what actual road tests under severe conditions show. Up to 42% longer wear for cold rubber passenger car tires, compared with HAF black. And up to 24% more mileage for natural rubber truck tires, compared with natural rubber and EPC black. Tests proved super resistance to cut and crack growth, too!

Order Philblack E in truckload or carload quantities from the technical sales representative who calls on you, or from the nearest Philblack office.

PHILLIPS CHEMICAL COMPANY

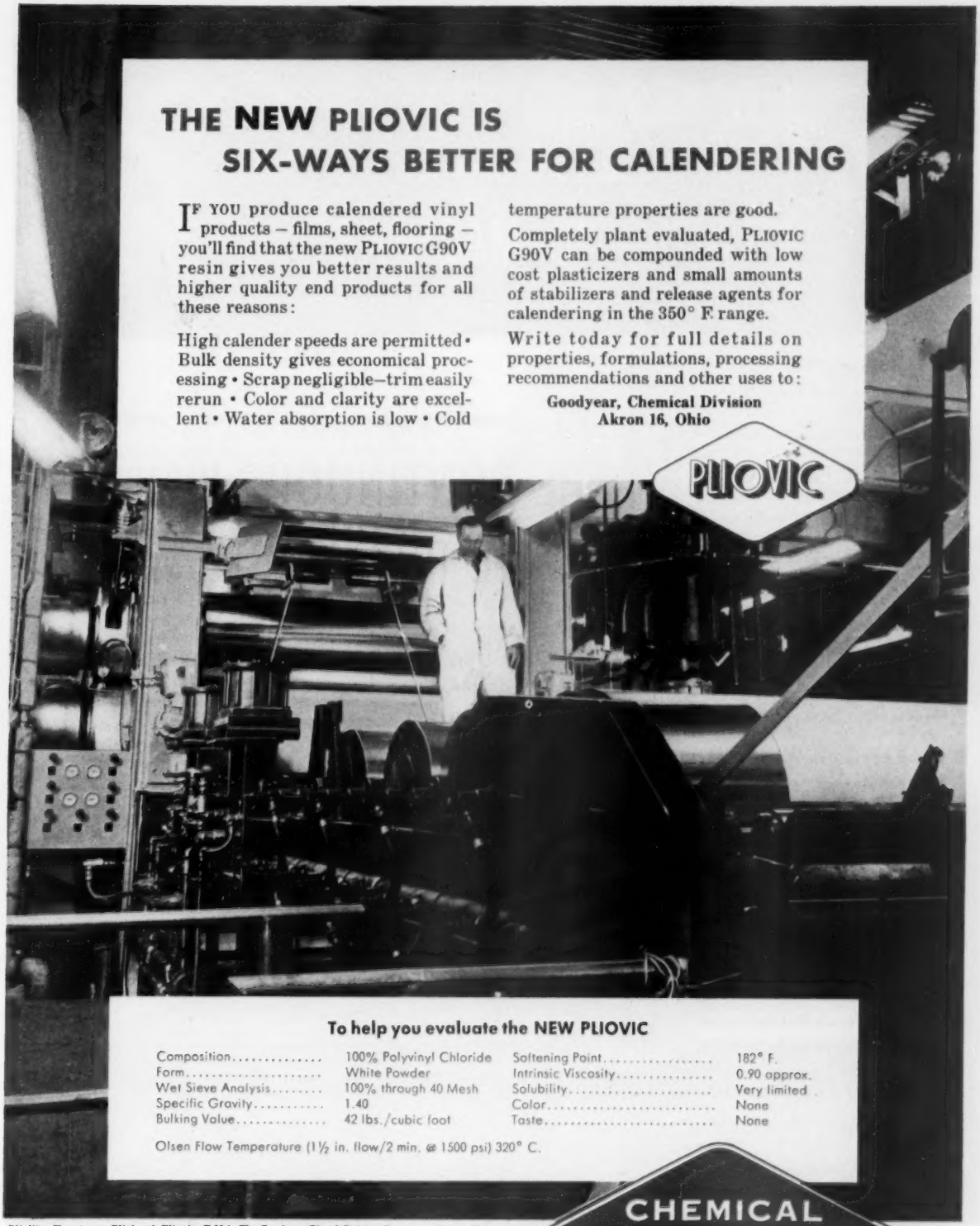
PHILBLACK SALES DIVISION

EVANS BUILDING • AKRON 8, OHIO

PHILBLACK EXPORT SALES DIVISION • 80 BROADWAY • NEW YORK 5, N. Y.

* A Trademark

Philblack E, Philblack A and Philblack O are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago and Trenton. West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.



THE NEW PLIOVIC IS SIX-WAYS BETTER FOR CALENDERING

IF YOU produce calendered vinyl products – films, sheet, flooring – you'll find that the new PLIOVIC G90V resin gives you better results and higher quality end products for all these reasons:

High calender speeds are permitted • Bulk density gives economical processing • Scrap negligible–trim easily rerun • Color and clarity are excellent • Water absorption is low • Cold temperature properties are good.

Completely plant evaluated, PLIOVIC G90V can be compounded with low cost plasticizers and small amounts of stabilizers and release agents for calendering in the 350° F range.

Write today for full details on properties, formulations, processing recommendations and other uses to:

Goodyear, Chemical Division
Akron 16, Ohio

PLIOVIC

To help you evaluate the NEW PLIOVIC

Composition	100% Polyvinyl Chloride	Softening Point	182° F.
Form	White Powder	Intrinsic Viscosity	0.90 approx.
Wet Sieve Analysis	100% through 40 Mesh	Solubility	Very limited
Specific Gravity	1.40	Color	None
Bulking Value	42 lbs./cubic foot	Taste	None

Olsen Flow Temperature (1½ in. flow/2 min. @ 1500 psi) 320° C.

Pliolite, Chemigum, Pliobond, Pliovic–T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

CHEMICAL GOODYEAR DIVISION

Use Proved Products

CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS

The Finest Chemicals in Industry

We think you'll like "THE GREATEST STORY EVER TOLD"– Every Sunday – ABC Network

OAKES

CONTINUOUS, AUTOMATIC

FROTHING MACHINE

Partial List of Users

American Foam Rubber Corporation
Burlington, New Jersey

American Latex Products Corporation
Hawthorne, California

Amertex Manufacturing Corporation
Portsmouth, Virginia

Armour & Company, Chicago, Illinois

Armstrong Rubber Company
West Haven, Connecticut

Automotive Rubber & Carpet Industries, Inc.
Yonkers, New York

Crown Rubber Company, Fremont, Ohio

Dunlop Tire & Rubber Corporation
Buffalo, New York

Faultless Rubber Company, Ashland, Ohio

Firestone Rubber & Latex Products Company
Fall River, Massachusetts

Fremont Rubber Company, Fremont, Ohio

Globe Manufacturing Company
Fall River, Massachusetts

Goodyear Tire & Rubber Company, Akron, Ohio

Hewitt-Robins, Incorporated, Buffalo, New York

International Latex Corporation
Dover, Delaware

James Lees & Sons Company
Bridgeport, Pennsylvania

Toyad Corporation, Latrobe, Pennsylvania

United States Rubber Company
New York, New York

Most installations use more than one unit.

If you are considering foam latex—natural or synthetic

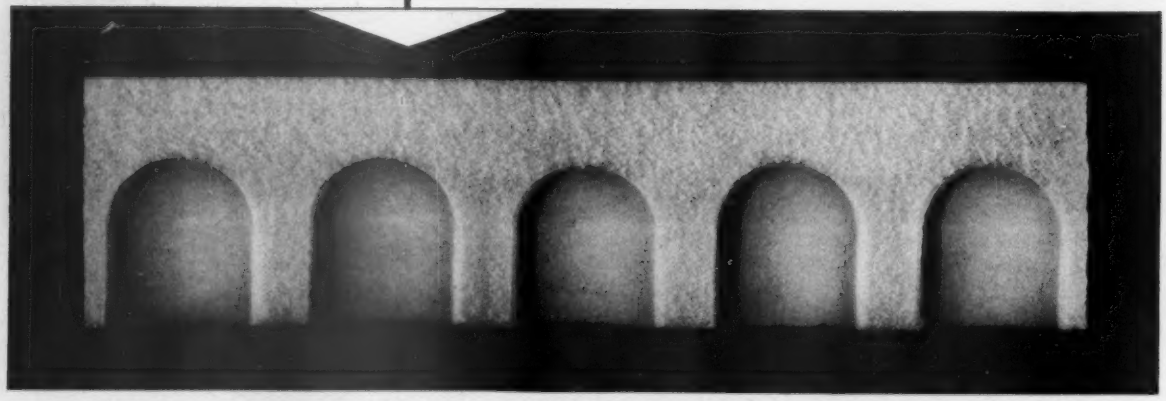
THE CONTINUOUS WAY IS THE PROFITABLE WAY!

Here is what the AMF-Oakes Continuous, Automatic Frothing Machine can do for you:

- Froth 200 to 2,000 pounds of foam latex per hour.
- Produce latex blow-ups of 6 to 18.
- Suitable for slabs, molds, rug backings, pillows, mattresses, furniture and automobile upholstery.
- Ideal for INJECTION MOLDING.

For Complete Information...

Write to Mr. T. R. Stevens,
Continuous Mixing Division
AMERICAN MACHINE & FOUNDRY COMPANY
511 Fifth Avenue, New York 17, N. Y.



Unretouched photograph of foam rubber frothed on the AMF-OAKES Continuous, Automatic Frothing Machine. (Latex blow-up of 14)

NOW YOU CAN MAKE HIGH-QUALITY, HIGHLY UNIFORM INNERSOLES WITH

PLIOLITE S-6B

Now you can make innersoles using PLIOLITE S-6B – Goodyear's use-proved resins for rubber reinforcement–and gain all these advantages:

- Uniformity within close tolerances
- Elimination of curling and cracking
- Freedom from perspiration absorption
- Longer wear • Higher tear resistance.

Innersoles made with PLIOLITE S-6B can be channeled and cut–can be used by shoe manufacturers in their standard equipment. Sheet and pre-cut innersole stock both offer excellent profit possibilities you won't want to miss.

Look over the table of rigid requirements met by PLIOLITE S-6B in innersole stock. And remember – *whatever your reinforcement needs* – you can step ahead of competition with PLIOLITE S-6B–"known as the best" reinforcing resin on the market. For full details, write:

Goodyear, Chemical Division
Akron 16, Ohio

CHEMICAL GOODYEAR DIVISION

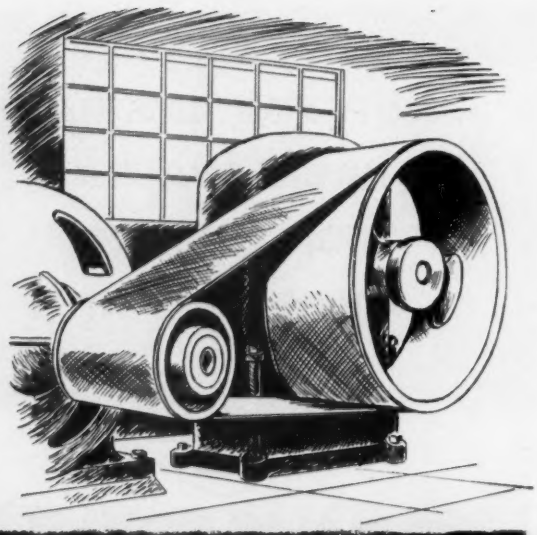
LEADING INNERSOLE MANUFACTURER'S SPECIFICATIONS
Easily Met with PLIOLITE S-6B

Tensile Strength, psi	over 1200
Elongation, %	100-125
Hardness, Shore A	92-95
Crescent Tear, lb./in.	over 300
Permanent Set at Break, %	under 35

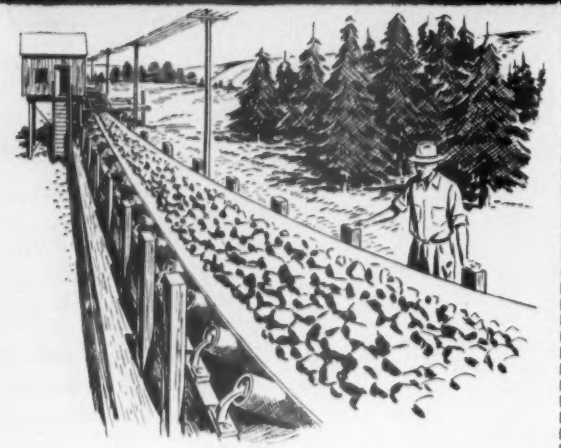
We think you'll like "THE GREATEST STORY EVER TOLD" Every Sunday – ABC Network

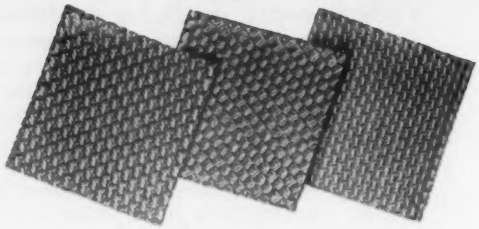
Chemigum, Pliobond, Pliolite, Pliovic–T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use-Proved Products – CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS – The Finest Chemicals for Industry



If it's got to do a SPECIAL job...





make it a Wellington Sears "fiber-engineered" fabric

In addition to its dependable line of sturdy, versatile cotton fabrics for the rubber industry, Wellington Sears has developed many new fabrics which utilize the special advantages of modern synthetic fibers, alone or in combination with cotton. High tenacity rayon fabrics, for instance, give new strength and lightness to low-gauge belts. Cotton-nylon and rayon-nylon combinations provide improved troughing qualities for conveyor belts. Rugged constructions of nylon, nylon-rayon and nylon-cotton make excellent breaker fabrics for heavy duty belts.

Whatever the application . . . whether it be a tough rayon reinforcement to make light, easily-handled steam hoses with minimum bursting hazard . . . or flexible, flex-resistant nylon or rayon cloth for pump and air compressor diaphragms . . . for these and many other problems, Wellington Sears can provide the answer with fabrics "fiber-engineered" and designed to meet specific mechanical requirements.

An abbreviated list of fabrics for the rubber industry is at the right. Your nearest Wellington Sears office will supply you with complete information.

An illustrated 24-page booklet filled with valuable facts on fabric development and applications of interest to present and potential users of industrial fabrics is yours for the asking. Write for a free copy of "Modern Textiles for Industry" to Wellington Sears Co., Dept. L-3, 65 Worth Street, New York 13, N. Y.

Superior Fabrics for the Rubber Industry

Belting duck
Hose duck
Enameling duck
Army duck
Single and plied-yarn chafers
Sheeting
Airplane cloth
Balloon cloth
Nylon, high-tenacity rayon, other synthetics and combinations.

Wellington Sears

A SUBSIDIARY OF WEST POINT MANUFACTURING COMPANY

FIRST In Fabrics For Industry

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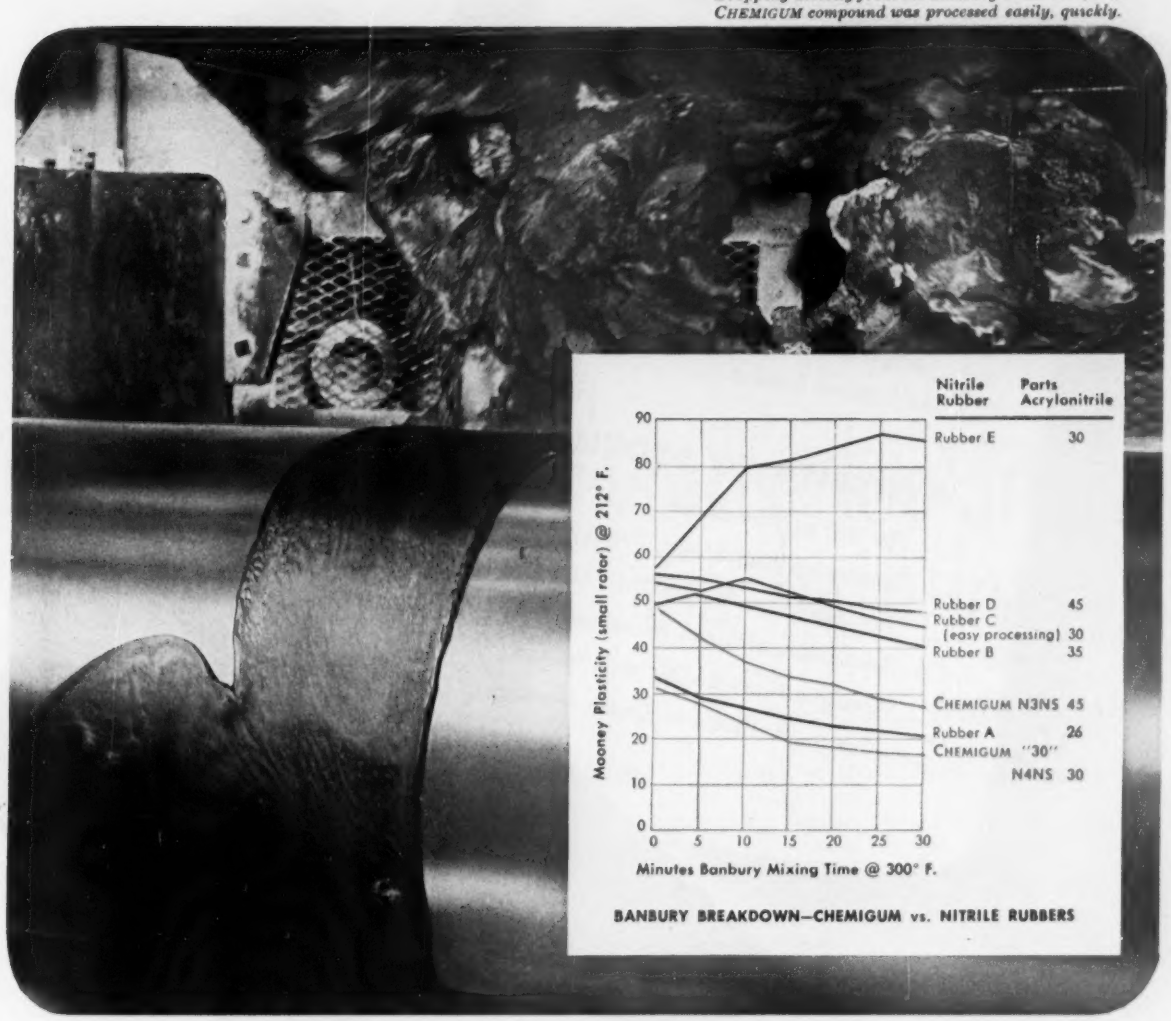
Dropping directly from the Banbury to the mill, this CHEMIGUM compound was processed easily, quickly.


Nitrile Rubber
Parts Acrylonitrile
Rubber E 30
Rubber D 45
Rubber C (easy processing) 30
Rubber B 35
CHEMIGUM N3NS 45
Rubber A 26
CHEMIGUM "30" N4NS 30
Mooney Plasticity (small rotor) @ 212° F.
0 10 20 30 40 50 60 70 80 90
0 5 10 15 20 25 30
Minutes Banbury Mixing Time @ 300° F.

BANBURY BREAKDOWN—CHEMIGUM vs. NITRILE RUBBERS

SAVE TIME–SAVE TROUBLE

with easier processing CHEMIGUM

POUND for pound of acrylonitrile content, no other nitrile rubber is easier to process either on the mill or in the Banbury than CHEMIGUM – Goodyear's use-proved, easier-mixing rubber.

With CHEMIGUM, you get all the gasoline, oil with solvent resistance of the nitrile rubbers–and low swell, high tensile strength and excellent abrasion resistance as well.

CHEMIGUM is being extruded, calendered and molded – CHEMIGUM Latex is being used in saturants, impregnants and coatings. For the easiest kind of production write today for details to:

Goodyear, Chemical Division, Akron 16, Ohio

Chemigum, Pliobond, Pliolite, Pliovic–
T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

CHEMICAL GOODYEAR DIVISION

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Use-Proved Products – CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS – The Finest Chemicals for Industry

PRODUCTION BENEFITS

- ☐ Perfect Separation of Stock and Liner
- ☐ Less Power and Labor
- ☐ Horizontal Storage, if desired
- ☐ No Cleaning of Liners
- ☐ Longer Liner Life
- ☐ Less Stock Losses

BENEFITS TO STOCKS

- ☐ No Lint or Ravelings
- ☐ Oxidation and Bloom Prevented
- ☐ Air, Moisture & Sunlight Excluded
- ☐ Tackiness of Stock Preserved
- ☐ Gauges More Easily Maintained
- ☐ Greater Latitude in Compounding

Check these Important Advantages of

CLIMCO Processed Liners

These advantages are not mere claims, but have been demonstrated over and over by the use of Climco Processed Liners in all kinds of rubber plants during the last 30 years. Surely, in the interests of better production at less cost, Climco Liners are worthy of use in your plant.

ILLUSTRATED LINER BOOKLET

Tells all about Climco Liners and Linerette and how to get better service from liners. Write for your copy now.

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Cable Address: "BLUELINER"
West Coast Representative:—MERIT WESTERN CO.
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PROCESSED LINERS
SERVING THE RUBBER INDUSTRY FOR 30 YEARS

LINERETTE INTERLEAVING PAPER
Treatment Contains
NO OIL OR WAX
Samples on Request

Illustration courtesy of
The Murray Corp., Detroit

If you're looking at the bath mat...

then you'll realize that NEVILLE plays an important part in the production of many household items, whether it's a bath-mat, stair-treads, drain-mats, floor-tile or molded electric plugs, as well as enamels, paints or varnishes. In countless every-day products, quality and durability are assured when the manufacturer uses

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COUMARONE RESINS

PRODUCTS OF TOMORROW FROM THE CHEMICALS OF TODAY

Tell us your particular need—we'll help you select the right Neville chemical for your purpose.

THE NEVILLE COMPANY
PITTSBURGH 25, PA.
Plants at Neville Island, Pa., and Anaheim, Cal.

C-4

from this rubber tree flows a WAY OF LIFE...

for AMERICA

Rubber is a key material in modern America.

Rubber makes possible the trucks, planes, buses and automobiles which keep America moving.

Rubber plays a basic role in communications — telephone, telegraph, radio and television.

Rubber is essential to American industry. It is an ingredient in thousands of products that keep America's factories running.

Rubber helps keep America strong. Without rubber, America could not build the military equipment needed for defense.

for MALAYA

Rubber is the economic lifeblood of Malaya.

Rubber is the chief cash crop of more than 350,000 small independent Malayan farmers as well as more than 1,000 large rubber plantations. They produce a major portion of the world's supply of natural rubber — with America their biggest customer.

Rubber keeps Malaya a free and active ally of the western democracies. *A prosperous natural rubber industry is the strongest bulwark against Communism in Malaya and the whole of Southeast Asia.*

Send for a free booklet
"NATURAL RUBBER and YOU"

The story of natural rubber—how it is grown, where it comes from, its history, together with facts and statistics about its production and use—is included in this pictorial booklet. Write to the

Natural Rubber Bureau

1631 K Street, N. W., Washington 6, D. C.

You name the TEMPERATURE

. . . we'll supply the right PX PLASTICIZER

From protective coverings in the Arctic to beach mattresses in the Tropics, today's vinyl plastic products must meet new and rugged temperature conditions. The broad line of Pittsburgh PX Plasticizers will provide you with the specific plasticizer, or the combination of plasticizers, you need to insure optimum *stability* and *flexibility* in vinyl products under practically any temperature extreme.

And remember this: as a basic producer, we're also able to offer you the assurance of top uniform plasticizer quality from one order to the next . . . fast, efficient shipments . . . and dependable, continuing supplies. What's more, our engineers may be able to show you how to further increase the quality of your product and reduce production costs through better plasticizer selection and use. *Why not call or write us today?*

PX-104	DiButyl Phthalate
PX-108	DilsoOctyl Phthalate
PX-138	DiOctyl Phthalate
PX-208	DilsoOctyl Adipate
PX-238	DiOctyl Adipate
PX-404	DiButyl Sebacate
PX-408	DilsoOctyl Sebacate
PX-438	DiOctyl Sebacate
PX-658	TetraHydroFurfuryl Oleate
PX-917	TriCresyl Phosphate

W&D 4240

PLASTICIZER DIVISION

PITTSBURGH COKE & CHEMICAL CO.

Grant Building • Pittsburgh 19, Pa.

COAL CHEMICALS • AGRICULTURAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

There's an easier way to separate SHEET or SLAB stock and lots healthier, too!

"AQUAZINC" IS YOUR ANSWER!

Using elephants to pull sheeted stock apart would be novel—but using Aquazinc to *keep* it apart is lots smarter! Highly concentrated zinc stearate solution—Aquazinc is applied as a spray or dip—eliminating the health and explosion hazards of dusting—the need for liners or cushions. Developed especially for sheet-mill or slabbed stock, Aquazinc lubricates too, giving you a smooth-flowing stock plus perfect tack control. It is readily absorbed, without affecting the stock—leaves a glossy, non-greasy finish that adds appearance-appeal. Write on your company letterhead for an experimental sample of Aquazinc to try in your plant.

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PURITY · UNIFORMITY · DEPENDABILITY

Chemical Industries, Inc.

BOSTON (Cambridge) MASS.

- Free Flowing
- Grit-Free
- Uniformly Well Formed Pellets

PELLETEX

The quality SRF carbon black used regularly by the world's leading rubber manufacturers.

CABOT

The GENERAL ATLAS Carbon Co.

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CABLE ADDRESS "HALLCO"

November 27, 1952

To Our Customers:

With the advent of this Thanksgiving Season, we are happy to again have the opportunity to thank you for the part you have played in making our past year so pleasant and successful. We feel deeply indebted to you for your continuing trust and sincerely thankful for your proven loyalty.

We are duly thankful for the business which you have given us and trust that we have continued to maintain the high standards of service to which we aspire. It is our desire, also, that all your dealings with us have been to your entire satisfaction. Our constant aim is to merit your confidence and good will.

With best wishes for your enduring success and prosperity, we remain

Very truly yours,

THE C. P. HALL COMPANY

C. P. Hall, President

CPH/mw

Experience, a necessary ingredient in the manufacture of any product, is especially essential in roll making where only by long and intimate association with an industry, can its requirements be thoroughly understood and successfully provided for.

To United's 50 years of roll making experience can be added the advantages of its continuing program of metallurgical research, basically sound engineering and modern production facilities—a combination that made, and has kept, United Rolls favorites in outstanding processing plants throughout the world.

• • •

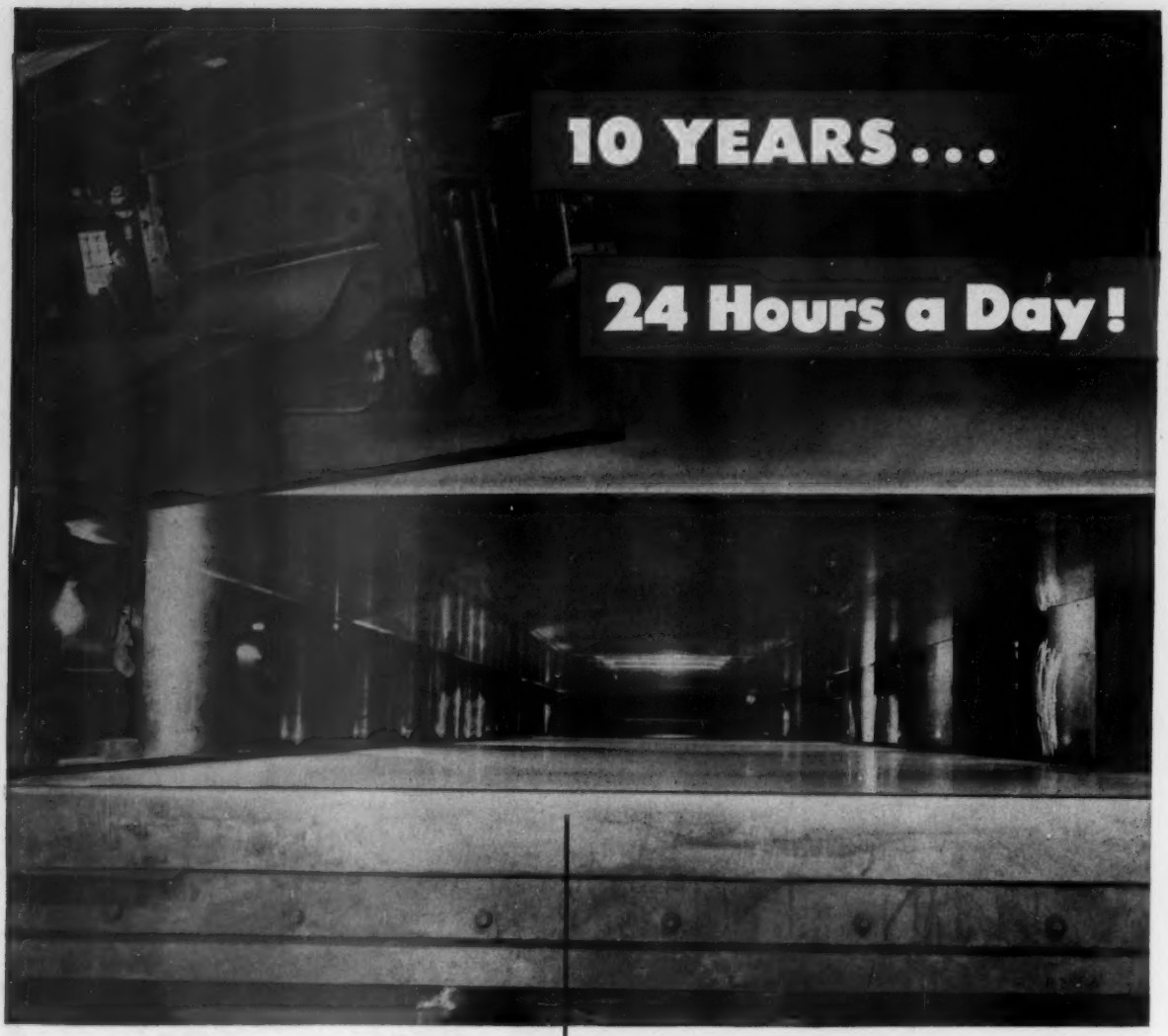
When in need of rolls—for whatever requirement—consult us.

UNITED ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh · Vandergrift · New Castle
Youngstown · Canton

Subsidiaries: Adamson United Company, Akron, Ohio
Lobdell United Company, Wilmington, Delaware
Stedman Foundry and Machine Co., Inc., Aurora, Ind.

Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



HYDRAULIC PRESSES AND VALVES
FOR EVERY PURPOSE • ACCUMULATORS •
ALLEVIATORS • INTENSIFIERS

R. D. Wood Company

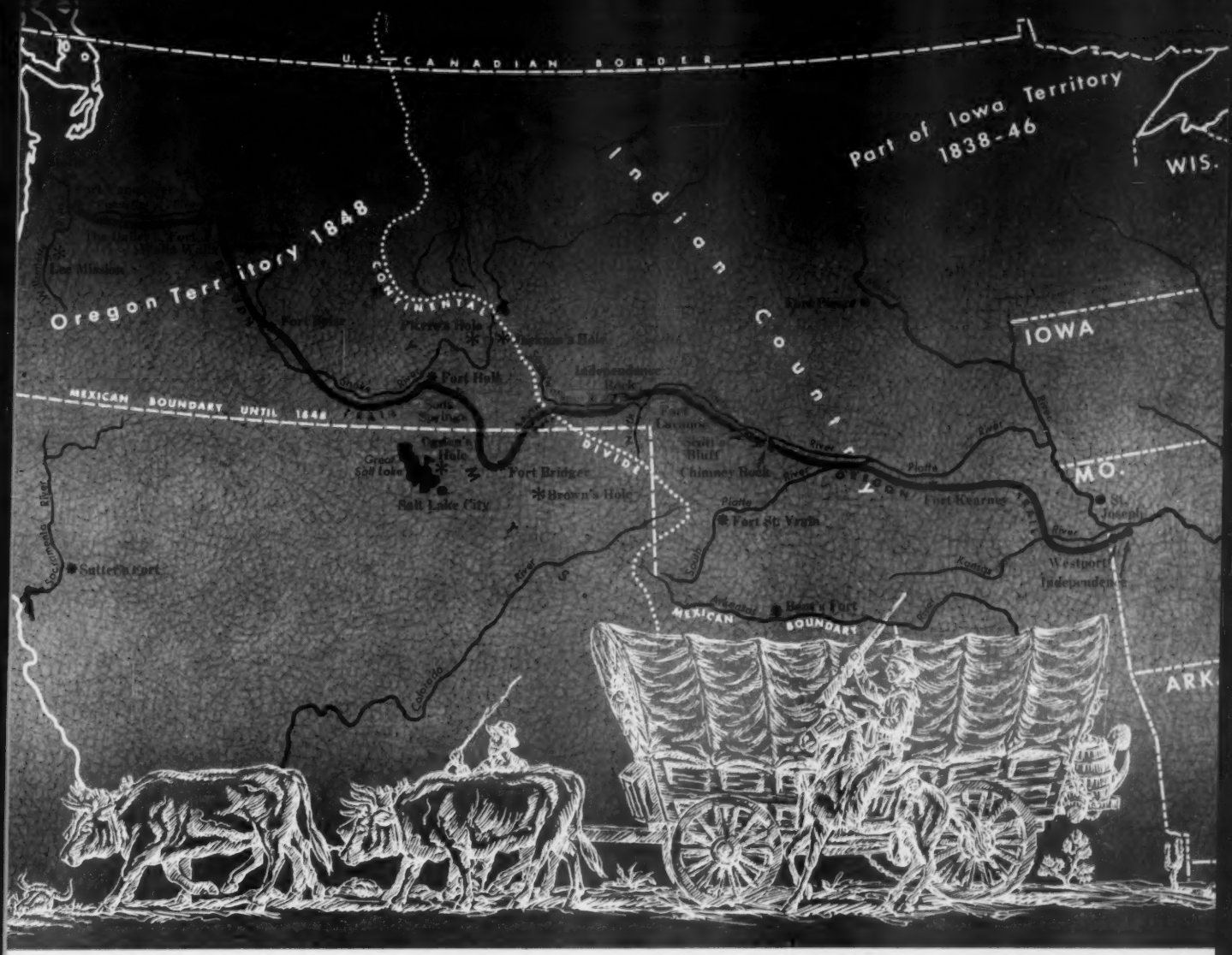
PUBLIC LEDGER BUILDING, PHILADELPHIA 5, PA.

Established 1803

The unretouched photograph above shows two 30′ x 5′4″ R. D. Wood press heating platens which have been turning out transmission and conveyor belting, packing, and similar industrial rubber products for the Thermoid Company of Trenton, New Jersey, for 10 years—working 24 hours a day.

Part of the R. D. Wood 3180 ton single opening hydraulic belt press pictured, these mirror-surfaced platens, in addition to the press itself, are still in excellent condition after over 87,000 hours of work, and give the Thermoid Company the quality it demands of its products, together with reduced production costs, fewer rejects, little maintenance.

Such performance from R. D. Wood hydraulic equipment can mean profit in *your* operations. R. D. Wood manufactures hydraulic presses and equipment for the rubber, plastics, plywood and metalworking industries. Write for information.



One in a Series of Famous Trails, a Reminder of Man's Progress in Transporting Himself and His Products.

THE OREGON TRAIL

In 1843, the "Great Emigration" left Independence, Missouri, for the long journey to Oregon. There were, Marcus Whitman wrote, "no less than 200 families, consisting of 1,000 persons of both sexes, 695 oxen, 773 loose cattle, more than 120 wagons." With good traveling conditions, the ox-drawn wagons lumbered along at two miles an hour. Some days only five miles were traversed. The emigrants started in mid-May, arrived at Whitman's Mission on the 10th of October.

The Oregon Trail was the longest trail, stretching over 2,000 miles with deep rivers, high ranges, arid wastes. It was the trail of the home-seeker. Jesse Applegate wrote in 1843: "No other race of men with the means at their command would undertake so great a journey, none save these could successfully perform it . . . relying only on the fertility of their own invention to devise the means to overcome each danger and difficulty as it arose."

Highways and roadways thread their way where once there was but a trail. And wherever there are people who need goods, materials and transportation, the rubber tires on trucks, buses and passenger cars are in service. Days have become minutes in miles covered, and the products of Oregon and the far west are as commonplace in eastern markets as in Oregon.

. . . . . .

One of the major contributions to the modern long-wearing rubber tire on which modern transportation depends is carbon black. Carbon black gives strength to rubber, and a durability that rubber tires had not previously possessed.

UNITED CARBON COMPANY is a producer of excellent carbon blacks and through its research and engineering provides the rubber industry with products which meet the challenging needs of the day, putting more miles in mileage.

UNITED CARBON COMPANY, INC.

Kosmos 60 is a High Abrasion Furnace (HAF) carbon black that is earning top rating for better processing, high reinforcement, and noteworthy resistance to abrasion.

Kosmos 60 is scientifically produced from special fuel in a most modernly designed furnace plant. Its manufacture is constantly controlled to yield a highly uniform carbon black of assured quality for the rubber industry.

Ease your tread problems with Kosmos 60.

UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

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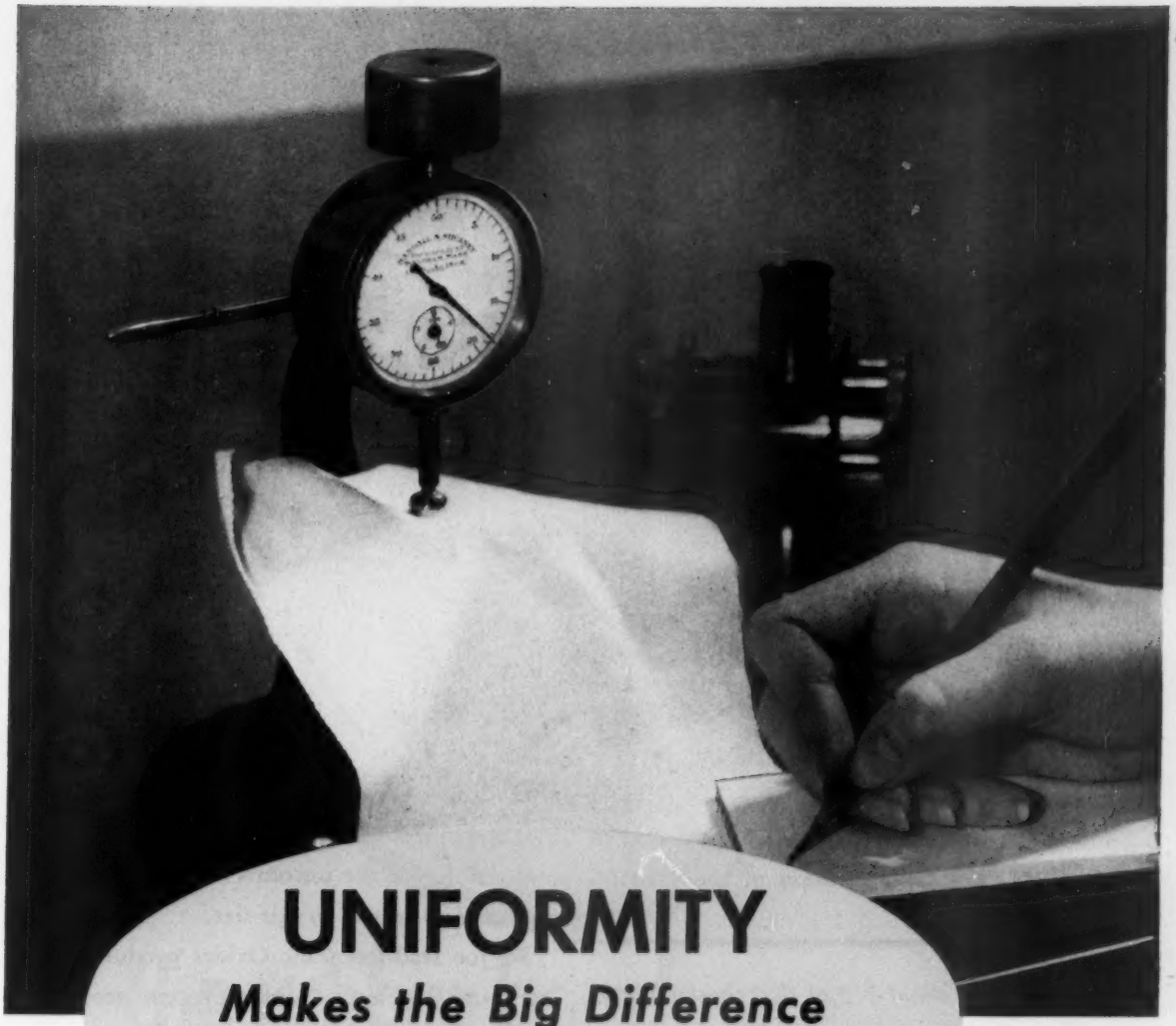
CANADA: CANADIAN INDUSTRIES, LTD.



UNIFORMITY

Makes the Big Difference

In INDUSTRIAL Fabrics

MT. VERNON FABRICS Give You Greater Fabric Uniformity

Shown is one of a series of laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products. Here fabric thickness after weaving is being gauged.

Mt. Vernon-Woodberry Mills

Branch Offices: Chicago • Atlanta • Baltimore • Boston • Los Angeles

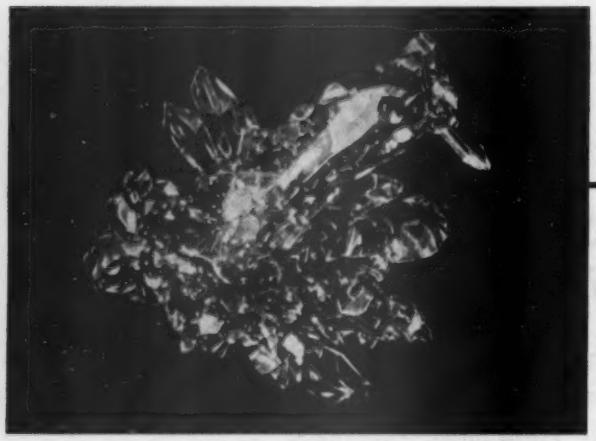
TURNER HALSEY COMPANY
Selling Agents
40 WORTH ST. NEW YORK

control

in Zinc Oxide Production can matter to you!

THE strange-looking object shown below is a metallurgical monstrosity — a cluster of zinc oxide crystals which was found in the neck of a zinc retort where it had grown in the course of years of abnormal operation of the furnace.

Actual size is about 1/5 of that shown below.



Although zinc oxide is crystalline in nature when viewed under a microscope, it is very rare to encounter the conditions of extreme heat combined with great pressure which were responsible for the uncontrolled growth of a normal ZnO crystal to this size.

St. Joe lead-free Zinc Oxides produced by our patented electrothermic process, are subjected to rigid control during all stages of manufacture — from ore to oxide. Absolute order-to-order uniformity is thus guaranteed to our customers.

Complete physical and chemical properties of St. Joe lead-free Zinc Oxides are described in our new technical manual, ST. JOE ZINC OXIDES. Write for your free copy — on your company letterhead please.

Lead-Free

ST. JOSEPH LEAD COMPANY
250 PARK AVE., N.Y.17 Eldorado 5-3200
Plant & Laboratory: Monaca (Josephtown) Pa.

the rubber bond even oil couldn't bother!

Yes, oil and a lot of other bonding problems are licked for good—with PARACRIL®, the oil-resistant chemical rubber. Its availability in both bale and crumb forms, outstanding processing characteristics, and unusual aging properties make it well suited for cements and solvated applications of all kinds. And the wide range of solution viscosities possible at any given nitrile level gives you entirely new processing control.

You'll find PARACRIL is an ideal elastomer for use as a bonding agent for rubber to rubber, rubber to fabric, rubber to leather, rubber to metal, vinyl to vinyl, leather to leather, wood to wood, wood to metal, and many other material combinations.

Try this new chemical rubber and see what it can do for you. Write for free samples and our new Technical Bulletin on the solvation of the PARACRILS.

SOLUTION VISCOSITY, CENTIPOISES

PARACRIL Grades	Solvated Without Prebreakdown	Solvated After Breakdown	Prebroken PARACRIL Solution Aged 30 Days
AJ	34,000	4,500	5,600
B	62,000	4,100	4,500
BV	40,000	.....	41,500*
BJ	9,800	3,800	4,000
C	27,000	4,800	5,200
CV	10,000	.....	13,000*

*PARACRIL used not subjected to prebreakdown

Viscosities reported are Brookfield, rotor No. 4 at 4 rpm, on a 20% by weight solution of PARACRIL in methyl ethyl ketone.

Breakdown was achieved by 10 passes through a rubber mill set at 0.030" gauge.

Naugatuck Chemical

Division of United States Rubber Company

1011 ELM ST., NAUGATUCK, CONNECTICUT

IN CANADA: NAUGATUCK CHEMICALS DIVISION • Dominion Rubber Company, Limited, Elmira, Ontario

Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

Announcing...

a completely New

entirely Different

surprisingly Low Cost

BASIC RAW MATERIAL

Available Solid

Flaked

or in Solution

PICCO

PENNSYLVANIA INDUSTRIAL CHEMICAL

CLAIRTON • PENNSYLVANIA

Plants at: Clairton, Pa.; West Elizabeth, Pa.; and Chester, Pa.

PICCOPALE

A 100% Polymerized Petroleum Resin

Clear, Clean

Transparent, Thermoplastic

Available in Enormous Quantities

PICCOPALE is a completely new type of synthetic resin—not just another variety of one of the familiar types. It is entirely different from anything developed heretofore . . . is produced in very large quantities . . . and is priced low enough to make it feasible for use as a basic raw material.

PICCOPALE offers a new approach to improved quality and lower costs. This brand-new synthetic resin, developed and produced by Pennsylvania Industrial Chemical Corporation provides good chemical resistance, pale initial color, excellent compatibility and ready solubility.

If you are interested in a bulk material that is absolutely waterproof, that is easy to use with other materials, that is low in cost, high in quality and readily available, investigate PICCOPALE!

We will be glad to send complete data and samples. Please specify application, and whether the sample of PICCOPALE should be in the form of flake, solid or a liquid solution.

write for complete data and samples

CORPORATION

Use the Coupon

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP.
CLAIRTON, PENNSYLVANIA

Please send sample of PICCOPALE for (*application*)

_____

(*check*) **flake** ☐ **solid** ☐ **liquid solution** ☐

Name_____

Company_____

Address_____

RA

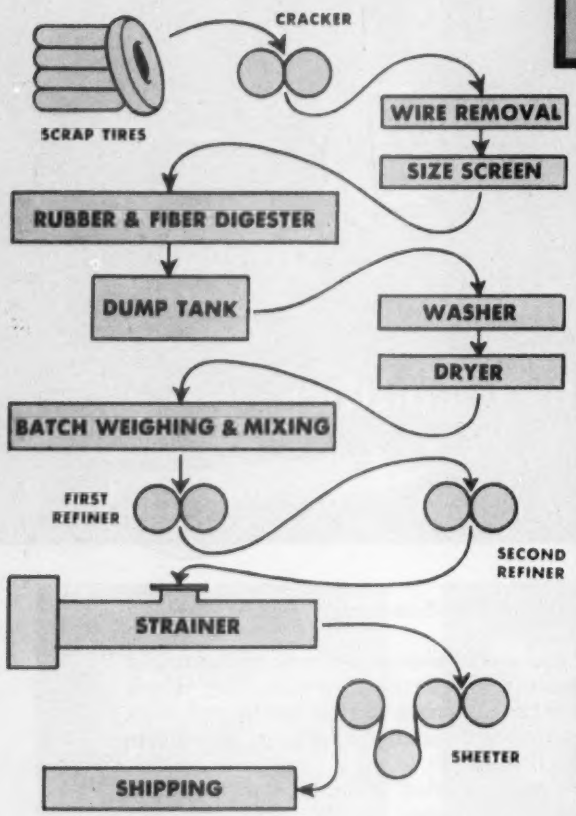
HERE'S WHY

DIP-PROCESS RECLAIMS

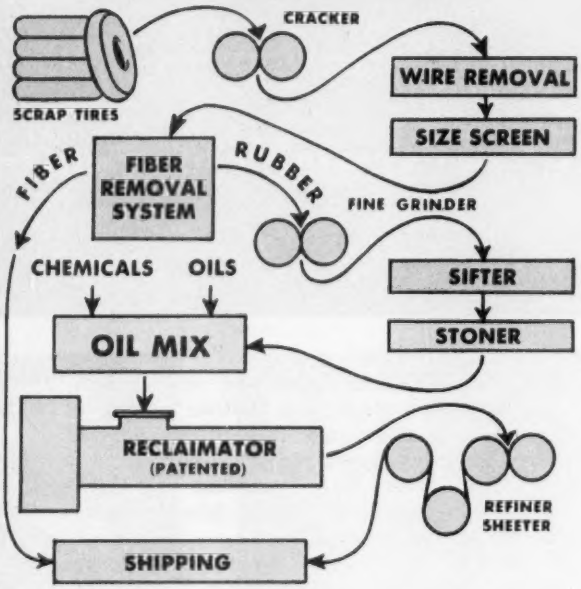
give you

★ HIGHER QUALITY
★ BETTER PROCESSING
★ LOWER COSTS

CONVENTIONAL PROCESS
24 HOURS



DIP-PROCESS
24 MINUTES



The two flow-charts above will readily demonstrate why our new exclusive and patented DIP-PROCESS of rubber reclaiming delivers greater quality to every user. Because of the *extremely short cycle* in which the compound is in process, MORE of the *original quality* of the rubber is retained. This in turn imparts greater resistance to (1) abrasive wear (2) heat and (3) ozone and better aging of your finished products.

Dip-Process Reclaims are also more uniform, less scorchy and have the correct tackiness. In addition, they permit larger Banbury loadings and faster mixing.

And, here's how Dip-Process Reclaims can substantially lower your costs! Now, you can use higher loadings of reinforcing fillers and softeners (such as MR and unsaturated petroleum products) with no deterioration of physical properties. Write us now for ALL the details!

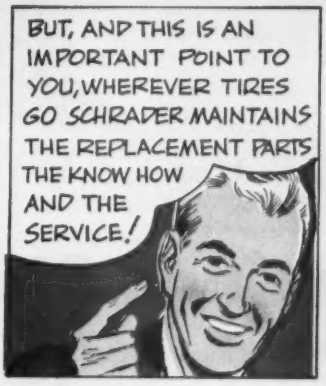
69 years serving the industry solely as reclaimers

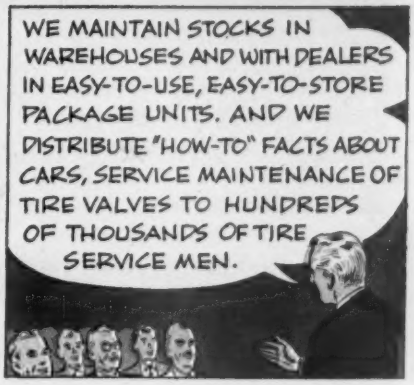
U.S. RUBBER RECLAIMING COMPANY, INC.

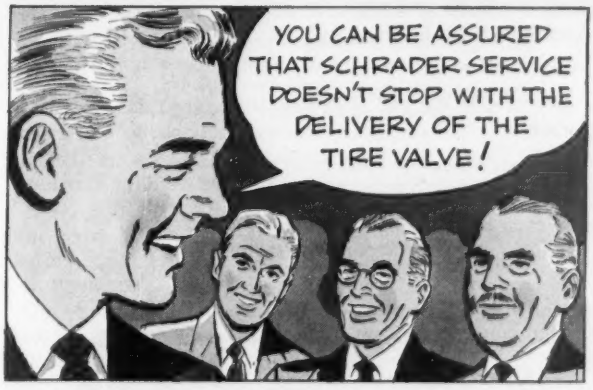
Schrader Contributions to the Tire Industry

Our world-wide service protects your reputation

YOUR NEW TIRES WITH NEW SCHRADER STANDARD TIRE VALVES GO ALL OVER THE WORLD YEAR AFTER YEAR. SOME TIRES AND VALVES WILL BE ABUSED AND NEED REPAIRS.


BUT, AND THIS IS AN IMPORTANT POINT TO YOU, WHEREVER TIRES GO SCHRADER MAINTAINS THE REPLACEMENT PARTS THE KNOW HOW AND THE SERVICE!


WE MAINTAIN STOCKS IN WAREHOUSES AND WITH DEALERS IN EASY-TO-USE, EASY-TO-STORE PACKAGE UNITS. AND WE DISTRIBUTE "HOW-TO" FACTS ABOUT CARS, SERVICE MAINTENANCE OF TIRE VALVES TO HUNDREDS OF THOUSANDS OF TIRE SERVICE MEN.



Schrader service backs you right down to your own customer . . . the consumer. Whether he is a fleet operator with 500 trucks or your neighbor with the family car . . . Schrader provides all the information and equipment to dealers everywhere to help your customer get all the miles you built into your tires.

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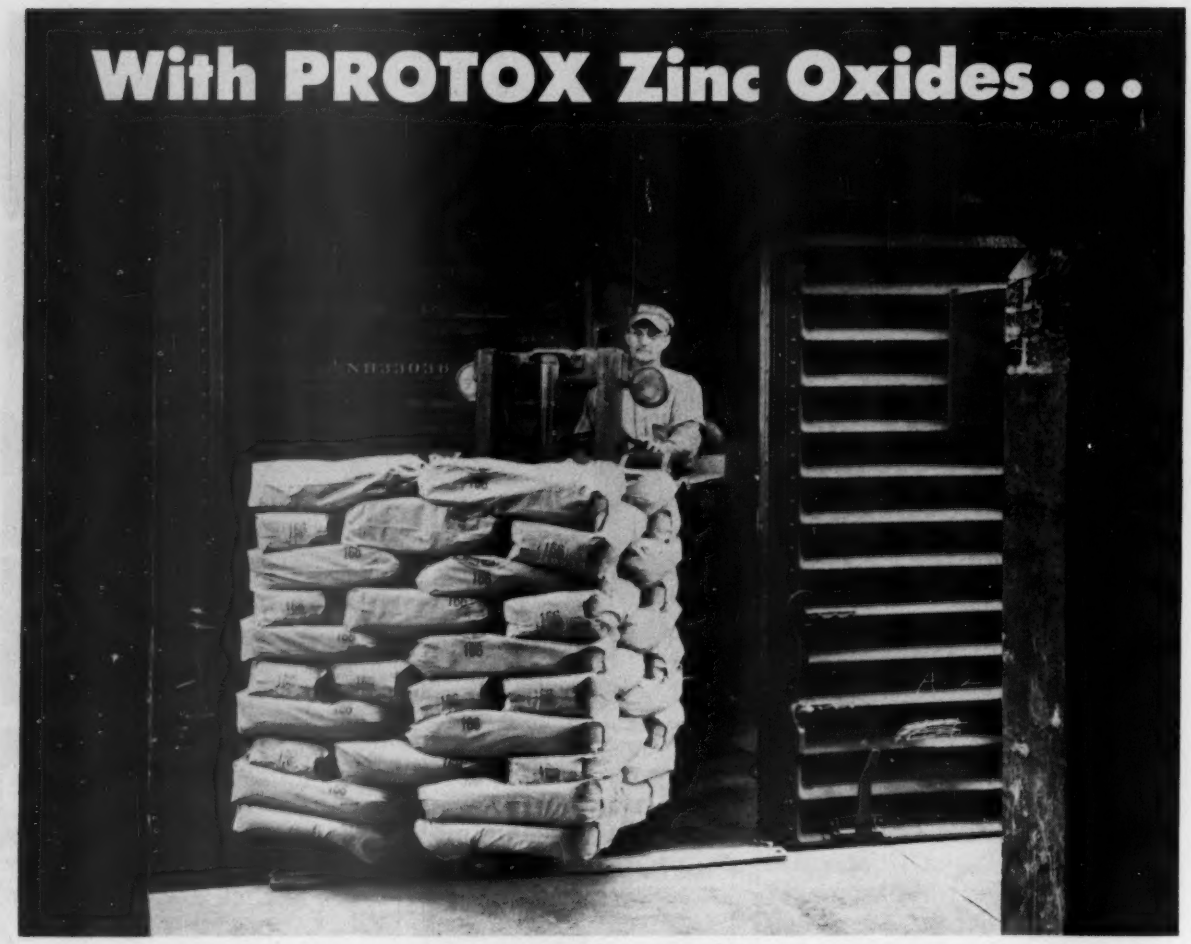
Division of Scovill Manufacturing Company, Incorporated

Schrader
REG. U. S. PAT. OFF.

FIRST NAME IN TIRE VALVES
FOR ORIGINAL EQUIPMENT AND REPLACEMENT

With PROTOX Zinc Oxides . . .



Your Savings Start Here

You save both time and dollars in unloading cars of Protox zinc oxides, because of the efficient unit-load method of shipping pioneered by us in 1948.

Each load is a compact, stable unit that you can handle as a whole or as separate bags. The number of unit-loads per car depends upon the grade of Protox you use.

IF YOU USE A FORK LIFT-TRUCK

One operator and helper, for example, can unload a 36-ton car of Protox-166 zinc oxide in about 2 hours—a big saving in time and labor.

IF YOU USE A PLATFORM TRUCK

You can load more bags of Protox-166 zinc oxide on each of your skids or pallets, compared with conventional zinc oxides—because each bag of Protox-166 bulks about 33% less. This means fewer trips from car to storage—with accompanying savings in time and labor.

For more details about unit loads on each of our 4 Protox grades (#166, #167, #168, #169) just write us for illustrated folder or ask our representative.

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

. . . most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

HORSE HEAD PRODUCTS

The walls come tumbling down!

THE WALLS OF JERICHO remained impregnable until a blast of seven trumpets released forces powerful enough to level the masonry.

Like Joshua's trumpets Di-tertiary-butyl Peroxide (DTBP) is a compelling initiator of action. DTBP catalyzes resin polymerizations. One example: the preparation of styrenated alkyds—raw materials for surface coatings that air-dry with unusual rapidity.

As a catalyst DTBP has important advantages. It gives high conversion efficiencies. Its decomposition rate is uniform . . . *governed entirely by temperature control.* Its action is independent of the kind of monomer, prepolymer or reaction medium.

DTBP leaves no color-forming bodies, no acid residues. It helps to produce clear or lighter colored polymers.

Further, DTBP is stable, insensitive to shock, non-corrosive . . . poses no storage or handling problems. And its high activation temperature allows premixing with monomer.

Get the full story now—send for our DTBP brochure. Your letterhead request will also bring you a sample for evaluation.

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CHEMICAL PARTNER OF INDUSTRY AND AGRICULTURE

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In Flexing and Abrasion Tests
Philblack* O *Scores Lots of Bests!*

Rubber compounds made with Philblack O pass laboratory Flexometer and Angle Abrader tests with exceptionally high scores! And when they get out in the workaday world they live up to their promises. Conveyor belts, industrial hose and tire treads made with this HAF (High Abrasion Furnace) black show outstanding resistance to abrasion, aging, cracking, cutting and chipping. For example, 9:00 x 20 and 10:00 x 20 truck tires have been giving wear results as high as 150 miles for .001" non-skid loss. This corresponds to 53,000 miles of life for the original tread!

Bulk or bagged Philblack O is shipped from Borger, Texas, Lcl and Ltl bagged shipments are also available in Akron, Boston, Chicago, Trenton, Los Angeles, Montreal and Toronto.

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PHILBLACK SALES DIVISION

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PHILBLACK EXPORT SALES DIVISION • 80 BROADWAY • NEW YORK 5, N. Y.

* A Trademark

Philblack A and Philblack O are manufactured in Borger, Texas. Warehouses in Akron, Boston, Chicago and Trenton.
West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

When Every Minute Counts...

You Can Count On DAVIS-STANDARD EXTRUDERS

For a new high peak in production, achieved in less time and at lowest cost, you can depend on these rugged work horses of the rubber industry.

Designed and built by men who understand the production man's needs and problems, Davis-Standard extruders have many features which overcome old disadvantages or add totally new production benefits.

Every functional part is engineered for the utmost in rugged simplicity and for sustained high output. Base for extruder and motor is fabricated steel plate, to permit the ultimate in design variation. Drive from variable speed motor is either V-belt or flexible coupling to an enclosed worm reduction gear drive. For long run operation the drive housing is equipped with a large cooling coil. Feed and gap section has large jacket for cooling or heating. All machines are equipped for screw temperature control. Heads are the exclusive high-velocity Davis-Standard "Stream-Flo" type, in straight or side delivery variations.

It will pay you to write for detailed specifications and list of plants using Davis-Standard extruders with great satisfaction.

We believe our equipment has exceptional benefits to offer, because of our experience gained as the world's largest makers of custom-built extruding machines.

Our engineers will cooperate with yours to solve your production problems

THE STANDARD MACHINERY COMPANY

18 WATER STREET MYSTIC, CONN.

MOLDING PRESSES AND EXTRUSION MACHINES

World's Largest Manufacturers of Custom-Built Extrusion Machines

Export Office: Ballagh & Thrall, Independence Square, Philadelphia 6, Pa.

SHELL INDUSTRIAL

bring greater under extreme

FOR GEARS...

SHELL MACOMA OILS

FOR ENCLOSED GEARS, Shell Macoma Oils solve the problem of extreme pressure lubrication with *seven distinct advantages:*

1. Extreme load carrying capacity . . . remarkable ability to prevent wear and seizure . . . even after long periods under heavy load.

2. Long-lasting oxidation stability . . . plus freedom from sludge formation in the presence of water.

3. Outstanding adhesion . . . maximum protection against rust, and against leakage through worn bearings and seals.

4. Non-corrosive . . . will not cause corrosion of steel or alloy bearings.

5. Non-Foaming . . . Shell Macoma Oils successfully overcome the tendency to foam caused by aeration of oil in the gear chamber.

6. Speedy water separation.

7. Complete stability in storage and in service . . . no tendency to separate, even in extremes of heat and cold.

SHELL

Be sure to get all the facts about these Shell Macoma Oils. Check the coupon and attach to your letterhead for full information.

Two great products of

EP LUBRICANTS

safety to gears and bearings loads and adverse conditions

FOR BEARINGS...

SHELL ALVANIA EP GREASE

FOR GREASE-LUBRICATED bearings, Shell Alvania Grease . . . the one grease that serves *all* grease applications in the majority of plants . . . *now is available with EP qualities added! . . . now even more Multi-Purpose.*

All of these unique advantages of Alvania Grease are therefore available for the first time to operators of machines subject to extreme bearing pressures:

1. Higher mechanical stability than any conventional grease at operating temperatures.

2. Pumpable at low temperatures . . . even through centralized lubrication systems.

3. Stable at high temperatures . . . no phase changes—still a grease at high temperatures—still a grease upon cooling.

4. Resistant to water . . . won't wash out.

5. Longer service life . . . reduced consumption.

Shell Alvania EP Grease is the answer to some of the toughest lubricating problems in industry. In rolling operations, for example, operators of steel, rubber, plastic and paper mills report that this grease film *just won't be ruptured*, regardless of shock rolling load!

Check the coupon and mail today for additional information about Shell Alvania EP Grease.

Shell Oil Company
50 West 50th Street, New York 20, N. Y.;
or 100 Bush Street, San Francisco 6, Cal.

Please send available data on

☐ Shell Macoma Oils ☐ Shell Alvania EP Grease

Name_____

Company_____

Title_____

Address_____

SHELL OIL COMPANY

Thiokol* SYNTHETIC RUBBER TYPE FA

The most solvent resistant rubber for paint spray, gasoline and aromatic fuel hose

Thiokol synthetic rubber has long been recognized as the outstanding solvent resistant rubber. This property has led to its wide use in the fabrication of rubber goods that must withstand the deteriorating effects of lacquer and paint thinners and aromatic fuels.

The following formulated compound illustrates a typical formula:

HOSE LINER RECIPE

"Thiokol" FA	100.0
Zinc Oxide	10.0
SRF Black	60.0
Stearic Acid	0.5
B.T.D.S. (1)	0.4
D.P.G.	0.1
NA-22	0.1
Neoprene Type W Masterbatch	29.0

(1) Benzothiazyl Disulfide

Neoprene Type W Masterbatch

"Neoprene" W	100.0
E.L. Cal. Mag.	4.0
S.R.F. Black	55.0
Stearic Acid	0.5
Zinc Oxide	5.0

The Neoprene W masterbatch is added at the end of the mix and thoroughly blended with the base compound.

PHYSICAL PROPERTIES

	Original Properties	Aged 48 hours at 80° F. in SR-6 Fuel (Dried 2 hrs.)		Volume Swell (24 hrs. at 80°F.)	
Cure	40/298°F.	40/298°F.	% Loss	Distilled Water	4%
300% Stress	1375	—	—	Ethyl Acetate	24
Tensile	1375	900	34.5	Acetone	18
Elongation	300	230	23.0	SR-6	20
Durometer	74	—	—	SR-10	4

Because of the exceptional solvent resistance of Thiokol type FA, small percentages of synthetic elastomers can be added as processing aids without appreciably reducing its solvent resistance.

For additional technical information and Banbury mixing schedules, write:

This information is believed to be accurate. However, no warranty is expressed or implied regarding the accuracy of these data, or the use of this product.

Thiokol CORPORATION

*Reg. U.S. Pat. Off. 784 North Clinton Avenue, TRENTON 7, NEW JERSEY Prd. in U.S.A.

MEET HI-SIL "C"

COLUMBIA-SOUTHERN'S

newest

WHITE REINFORCING PIGMENT

Columbia-Southern is now making available to the rubber industry a completely new product designed to permit a new high in quality. This new white reinforcing pigment is Hi-Sil "C"—a hydrated silica currently being manufactured on an interim plant scale.

Most compounders are familiar with the superior properties imparted to non-black goods by regular Hi-Sil. This pigment has been widely accepted as standard in many vital uses where highest quality must be the everyday rule.

The comparison below presents average figures.

RECIPE

GR-S 1000	100.0
Zinc Oxide	5.0
Sulfur	3.0
PBNA	1.0
MBTS	1.2
TMTDS	0.15
Diethylene glycol	3.5
100° m.p. coumarone indene resin	15.0
Pigment (30 volumes)	58.5

TEST RESULTS (Cures at 280° F)

REGULAR HI-SIL

	MODULUS					HARDNESS		
CURE	100%	300%	500%	TENSILE	ELONGATION	0"	30"	TEAR
15	210	750	1670	2570	630	66	56	180
30	230	840	1890	2520	580	66	57	170
60	230	790	1990	2480	560	67	60	150

HI-SIL "C"

	MODULUS					HARDNESS		
CURE	100%	300%	500%	TENSILE	ELONGATION	0"	30"	TEAR
15	175	650	1550	3300	720	68	57	340
30	250	900	2325	3400	590	76	66	320
60	275	975	2475	3300	575	77	67	290

Note from the above that in GR-S, use of Hi-Sil "C" affords substantial tensile increases and almost 100% gain in tear resistance—*even by comparison with the superior results with regular Hi-Sil!*

To acquaint you with this further improvement in our development of the best in non-black reinforcing pigments, Columbia-Southern is ready now with sample quantities for evaluation purposes and limited commercial shipments. Contact the nearest office listed below for immediate attention.

ARE YOU ON OUR MAILING LIST TO RECEIVE TECHNICAL BULLETINS?

Mailing lists, as you know, have the habit of becoming inaccurate from time to time. So, if you were on our mailing list but have not received technical bulletins lately, or have moved, please confirm your mailing address. And of course if you would like your name added to the list, please let us know. Address your letter to the Pigment Dept. at our Pittsburgh office.

COLUMBIA-SOUTHERN
CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

EXECUTIVE OFFICES: FIFTH AVENUE AT BELLEFIELD, PITTSBURGH 13, PA. **DISTRICT OFFICES:** BOSTON CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • HOUSTON MINNEAPOLIS NEW ORLEANS • NEW YORK • PHILADELPHIA • PITTSBURGH • ST. LOUIS SAN FRANCISCO

- Soft and Easy to Grind
- Insoluble in all Vehicles
- Alkali and Acid Resistant
- High Heat Resistance
- Non-Fading to Light
- Non-Bleeding
- Wide Range of Shades
- Opaque

for Rubber Materials

Glidden leadership in pigment research has produced in Cadmolith* Colors the very finest reds and yellows available anywhere —measured by every standard of importance to material manufacturers, compounders of new and old materials and plastic molders and coaters.

Send for Folder giving complete details, with color chips. Write The Glidden Company, Chemical and Pigment Company Division, Union Commerce Bldg., Cleveland 14, Ohio.

QUALITY Glidden PRODUCTS

THE GLIDDEN COMPANY

CHEMICALS • PIGMENTS • METALS DIVISION

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*Trade Mark Registered

SUNOLITH* Lithopone

ZOPAQUE* Titanium Dioxide

TITANOLITH* Titanated Lithopone

DOUBLE-CHECKED CHEMICALS FOR THE RUBBER INDUSTRY

For ULTRA FINE PARTICLE SIZE

USE SHARPLES ACCELERATOR 57-9

XTRUDED ZINC DIMETHYLDITHIOCARBAMATE

TRY THIS TEST

Granules of SA 57-9

1. Are stable in handling and storage.
2. Crush easily.
3. "Rub out" to a non-gritty, dustless powder for complete dispersion in the rubber batch.

The ultra-fine particles of SA 57-9 insure maximum accelerator dispersion—of great importance to compounders, especially in the insulated wire and cable industry.

Physical Properties of SA 57-9

Physical Form	Xtruded granules
Color	White to slight yellow
Melting Point	243°F. (min.)
Chloroform Insoluble	1.8% (max.)
Volatiles	0.5% (max.)
Specific Gravity @ 20°/4°C.	1.65

Samples and technical information available from:

SHARPLES TRADE MARK CHEMICALS

SHARPLES CHEMICALS INC.

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HEVEATEX
CORPORATION
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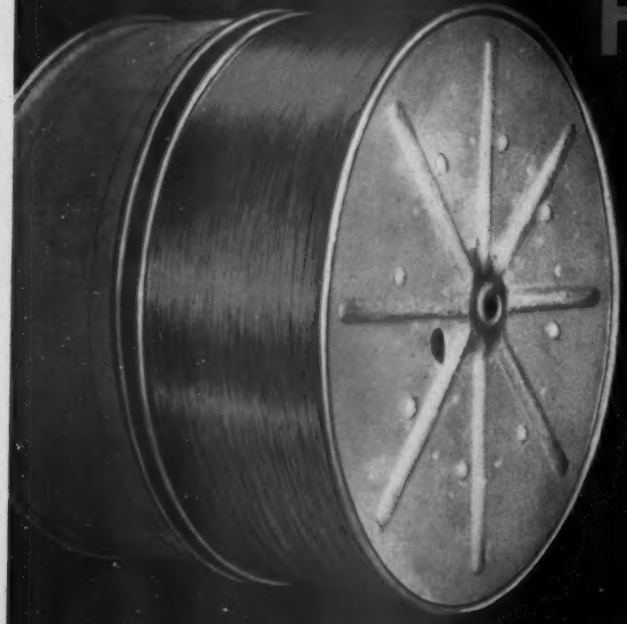
MELROSE 76, MASS.

BRANCHES: CHICAGO, ILL. AKRON, O. DETROIT, MICH. LOS ANGELES, CAL.

Natural and Synthetic

Latex and Latex Compounds

for all purposes



Hose REINFORCEMENT WIRE

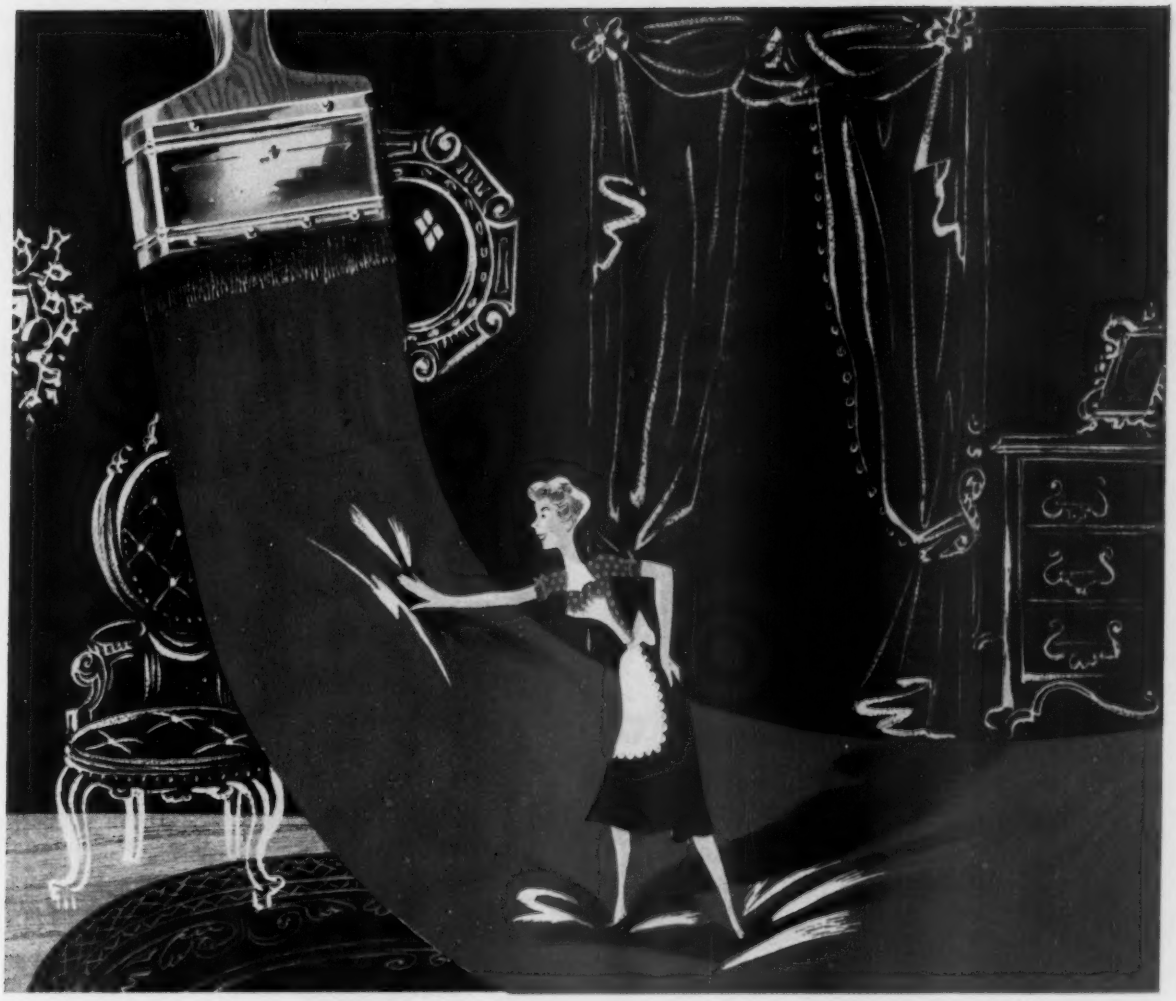
JOHNSON special bronze plated wire, for many years the preference of major tire manufacturers — now available for vacuum and defroster hose producers, in addition to conventional liquor finish wire.

• Uniformly clean finish • Maximum adhesion to rubber • Higher elongation • Extra fatigue properties

Johnson line of specialty wires also includes oil-tempered and coldrawn brush wire—tire bead wire—steel wire for field telephones —music spring wire.

If it's steel wire-JOHNSON specialists make it better

JOHNSON
STEEL AND WIRE COMPANY, INC.
Worcester 1, Mass. Akron, Ohio Los Angeles, Calif.



Look how Kralac gives paint "give"!

Now paint manufacturers everywhere can make paint so tough and resilient it's like rubber!

Thanks to Naugatuck Chemical and its pioneering in the development of rubber latex for paint, Naugatuck's Kralac, a special synthetic latex, takes the place of an oil base—gives paint a whole bucketful of wonderful new properties.

New durability! Rubber-tough paint made with Kralac doesn't chip or crack like ordinary paints—actually grows tougher as it grows older! It's so washable it is practically impossible to scrub away its lovely satin finish! So durable even lye won't bother it!

New paintability! Kralac-based paint is so easy to apply with roller or brush, even an amateur can do an expert job! It's dry in minutes—without offensive paint odor—without brush or lap marks. You can even retouch it hours or days later—without leaving a trace!

Easy to see why Kralac's special properties have the paint world in a stir. And there's a good chance Kralac can do equally big things for you. Take advantage of Naugatuck Chemical's unparalleled experience in compounding fine latices. For our technical bulletin on Kralac, send us the coupon below.

Naugatuck Chemical

Division of **UNITED STATES RUBBER COMPANY** • Naugatuck, Conn.

BRANCHES: Akron • Boston • Charlotte • Chicago • Los Angeles • Memphis
New York • Philadelphia **IN CANADA:** Naugatuck Chemicals, Elmira, Ontario

Naugatuck Chemical Plastics Division, 1011 Elm Street
Naugatuck, Connecticut

Without charge, send data on Kralac to:

NAME .....

TITLE .....

COMPANY .....

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CITY ..... ZONE ..... STATE .....

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IT'S "TOPS"

• SUPERIOR ELECTRICAL TESTS
• HEAT STABILITY
• COLOR

Sample and technical data sent promptly on request

SOUTHERN CLAYS, Inc.

33 RECTOR STREET
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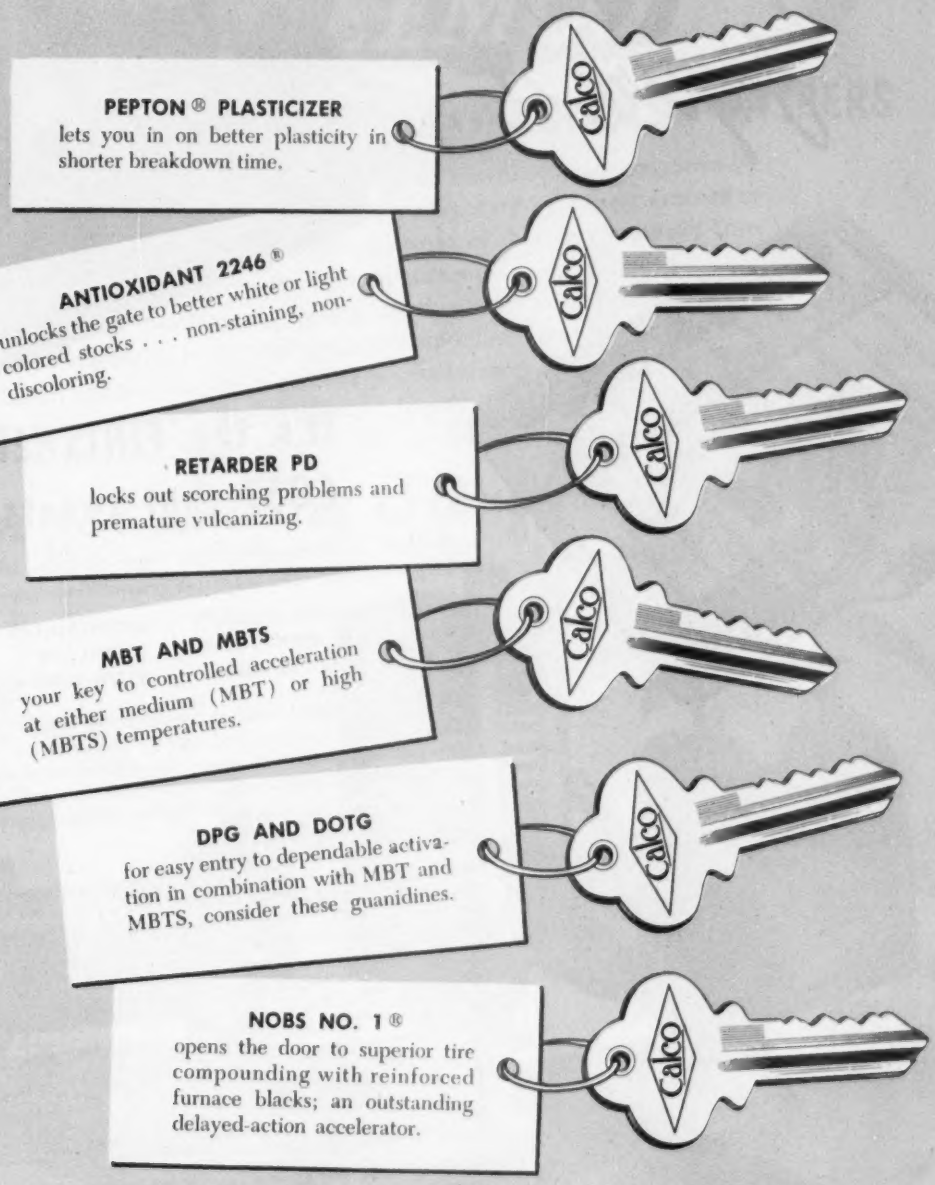
CALCO offers the keys to Quality Compounding


PEPTON® PLASTICIZER
lets you in on better plasticity in shorter breakdown time.
ANTIOXIDANT 2246®
unlocks the gate to better white or light colored stocks . . . non-staining, non-discoloring.
RETARDER PD
locks out scorching problems and premature vulcanizing.
MBT AND MBTS
your key to controlled acceleration at either medium (MBT) or high (MBTS) temperatures.
DPG AND DOTG
for easy entry to dependable activation in combination with MBT and MBTS, consider these guanidines.
NOBS NO. 1®
opens the door to superior tire compounding with reinforced furnace blacks; an outstanding delayed-action accelerator.
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AMERICAN Cyanamid COMPANY
CALCO CHEMICAL DIVISION
INTERMEDIATE & RUBBER CHEMICALS DEPARTMENT
BOUND BROOK, NEW JERSEY

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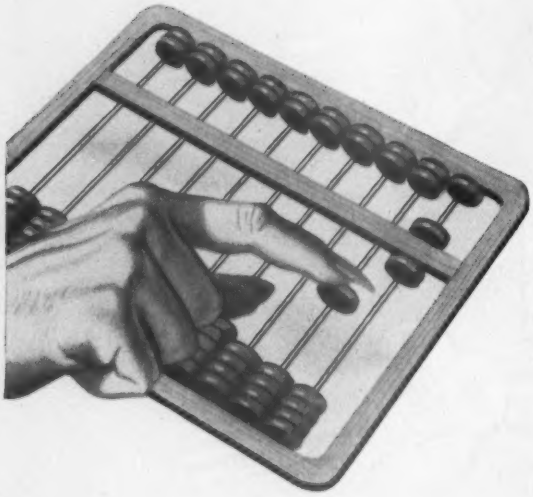

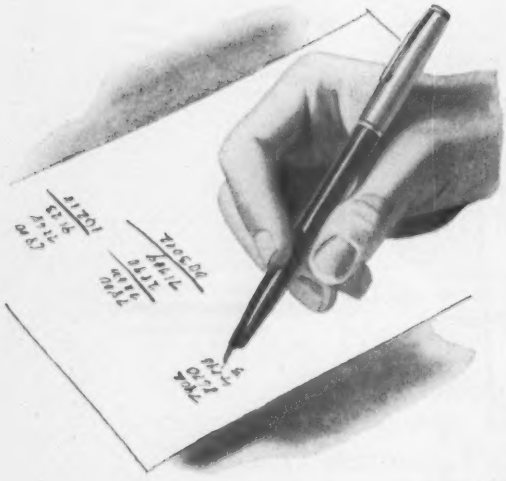

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Stabilizer	.57	3	3
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Tensile	—	2400 psi	2200 psi
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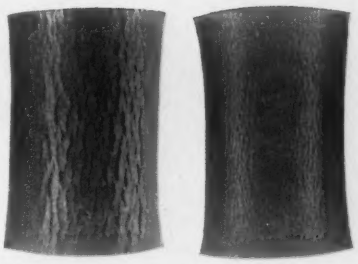

In natural rubber—Unprotected Compound A started to crack in 5 hours. Compound B, containing 1½ parts of Santoflex B on 100 parts of rubber hydrocarbon, ran 23 hours before cracking. Test continued for 214 hours.

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Samples were flexed in an ozonized chamber using the standard test atmosphere of 25 parts ozone per 10^8 parts air.

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	Appearance	Ash	Insolubles (benzene)	Specific Gravity
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Acid Fluoboric	●	●		●			●	●	●	●	●	●	●			●					
Acid Hydrofluoric, Reagent		●		●			●			●	●										
Alkali Fluoborates							●	●		●	●										
Aluminum Chloride, Solution		●	●			●	●		●	●	●	●	●	●		●	●	●	●	●	●
Aluminum Fluoride, Crystal		●								●		●	●								
Aluminum Nitrate		●		●								●							●		
Ammonium Acetate						●				●		●	●				●		●		
Ammonium Oxalate			●		●				●	●			●	●		●	●		●		
Ammonium Sulfate Purified and Reagent A.C.S.	●	●				●	●		●	●				●		●	●			●	
Ammonium Thiosulfate				●					●	●				●	●					●	
Boron Trifluoride Gas and Various Complexes		●								●	●	●	●	●		●		●		●	
Cadmium Nitrate	●	●		●			●					●	●			●					
Calcium Acetate Purified and Reagent		●				●							●	●		●		●	●		
Calcium Chloride, Anhydrous Purified and Reagent A.C.S.				●		●										●					
Calcium Phosphide					●						●										
Chlorine Trifluoride		●														●					
Chromium Fluoride		●	●							●			●							●	
Chromium Nitrate		●														●					
Chromium Potassium Sulfate (Chrome Alum)		●	●						●				●	●			●			●	
Cupric Nitrate		●	●		●			●		●				●						●	
Cuprous Chloride	●	●	●		●						●	●	●	●		●				●	
Ferric Nitrate			●						●											●	
Ferrous Ammonium Sulfate		●	●							●							●				
Lead Nitrate		●	●		●				●		●	●	●	●		●		●		●	
Metal Fluoborates										●					●						
Oxamide					●																
Potassium Acetate		●		●					●	●				●		●	●			●	
Potassium Bifluoride		●		●			●			●										●	
Potassium Borate, Tetra										●											
Potassium Fluoride		●								●											
Potassium Nitrite		●	●			●				●		●						●	●		
Potassium Permanganate																					●
Potassium Titanium Fluoride											●						●				
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Sodium Fluoride, Reagent A.C.S.								●					●								
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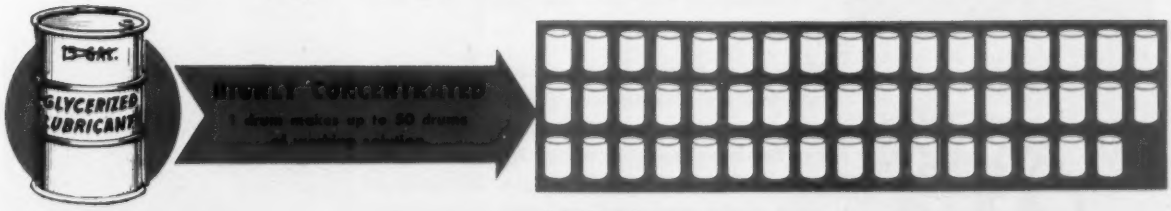

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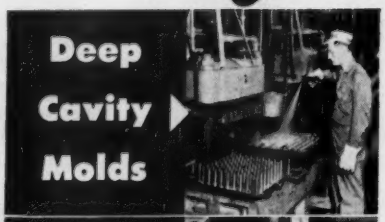

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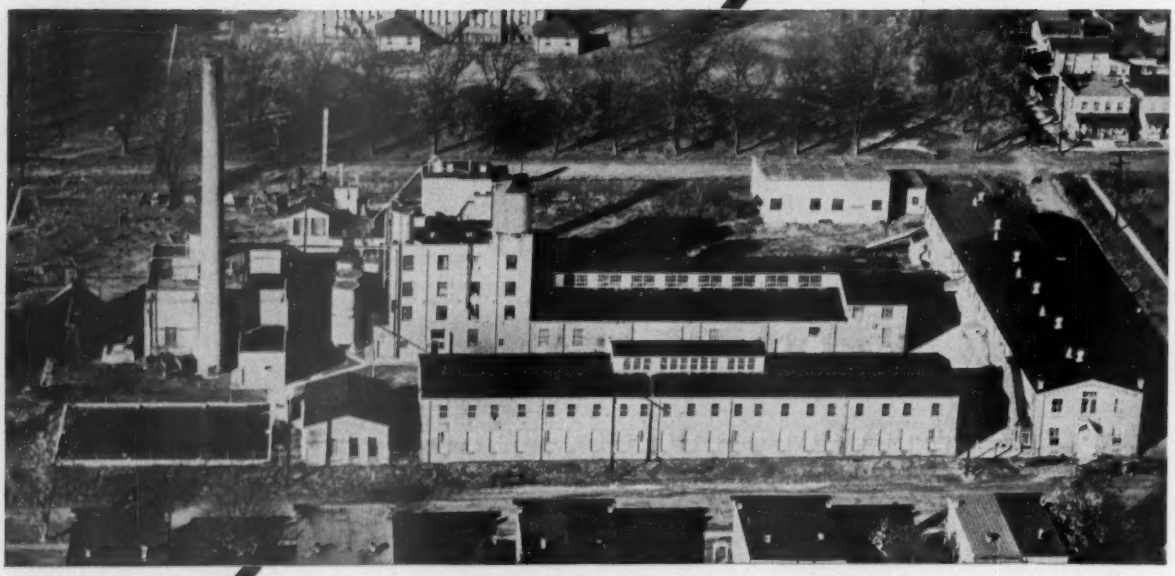

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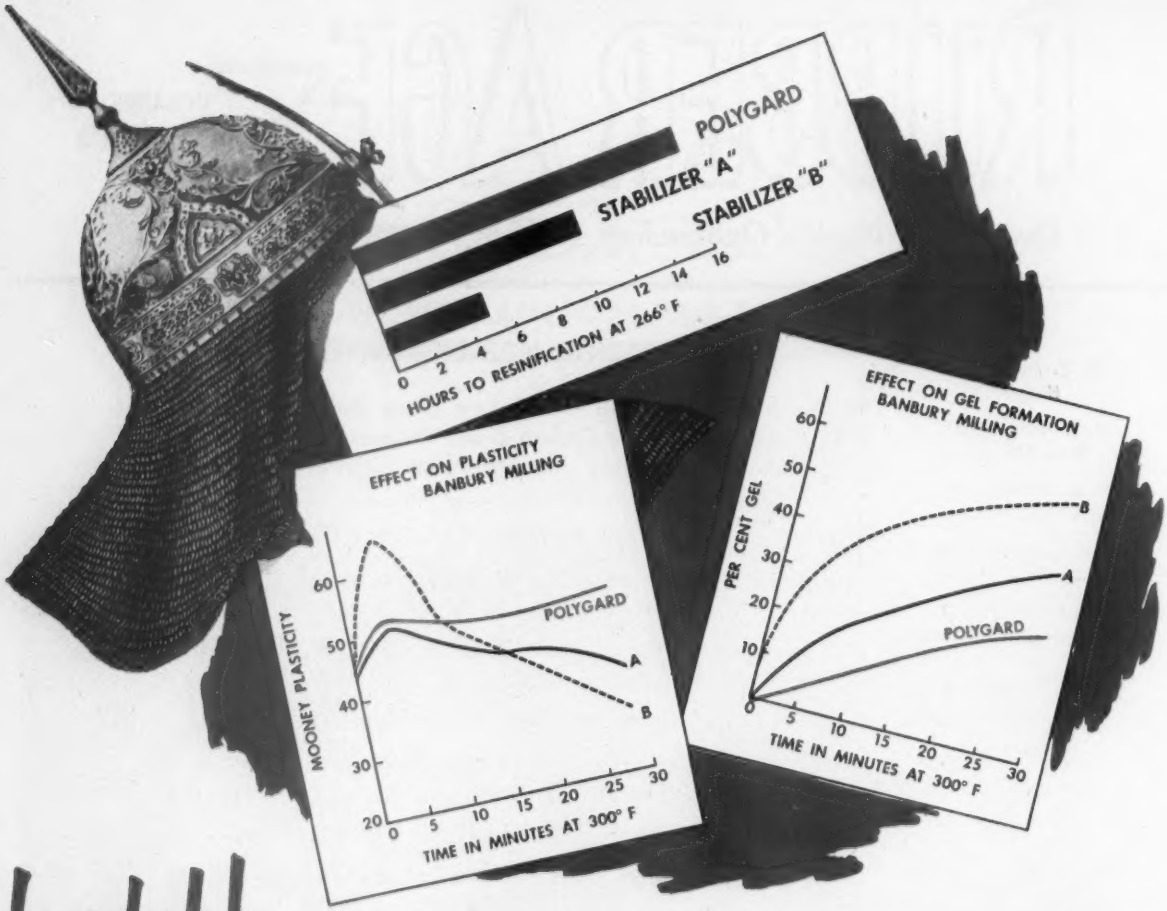

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RUBBER AGE

Vol. 72, No. 2 NOVEMBER, 1952

The Role of Heat in the Carbon Black Reinforcement of Rubber

Part II—Carbon Black Dispersion and Heat in Factory Processing for Optimum Reinforcement

By H. A. BRAENDLE

Columbian Carbon Company, New York, N. Y.

IN Part I the fundamental properties of carbon and their role in rubber, and the mechanism by which it is believed that the rubber to carbon bond is formed, have been presented. In this part (II), two well recognized prejudices, which have resulted in more frustration and second-rate rubber than possibly anything except actual mistakes in compounding, will be discussed.

It will be shown that the ideal so long striven for of a uniform particulate dispersion of carbon black in rubber, as in a tire tread, for example, is contrary to the inherent properties of rubber and its greatest source of strength —carbon black. It will also be shown that hot mixing, which in the past had to be lived with because like the poor it was always with us, is today one of the compounder's most effective tools not only to control quality at existing levels but also to improve quality to keep up with the ever-increasing demands for better and better goods.

Dispersion of Carbon Black in Rubber

A good dispersion of carbon black in rubber is desirable even if only for the very practical purpose of getting full value out of the carbon. Theoretically, a particulate, uniformly spaced dispersion of carbon in rubber would seem to be the ideal. Most mathematical approaches to the problem of rubber reinforcement start with this assumption. At best, these fit only a very short part of the stress-strain curve, generally in the region of low elongation, and before the effect of the rubber-carbon attachments have asserted themselves.

Much as these perfect or idealized dispersions have been sought, it is doubtful whether they have ever been obtained, in a good-wearing tread compound, for example. Rather, it now appears that the good-wearing properties of rubber treads have resulted from a spacial disposition of the carbon in the rubber far removed from the particulate and uniform. It is obvious that in the idealized dispersion, electrically-conducting rubber or static-dissipating rubber would be impossible at tire tread loadings of carbon black. It is also doubtful whether such a picture could ever give a tough-wearing material with the necessary flex and give essential to tire life.

In 1936 Wiegand *(1)* presented a rubber theory in which he envisaged discrete units of rubber with relatively little or no pigmentation. These rubber units were surrounded by carbon black particles bound to the rubber but still capable of contact with each other (at tire tread loadings) and therefore electrically conducting, and also capable of generating heat through friction under flexing

Note: This paper was presented before the Swedish Rubber Institute, Stockholm, Sweden, May 2, 1952. Part I, on "The Carbon Gel Complex in Reinforcement", was published in our October, 1952, issue.

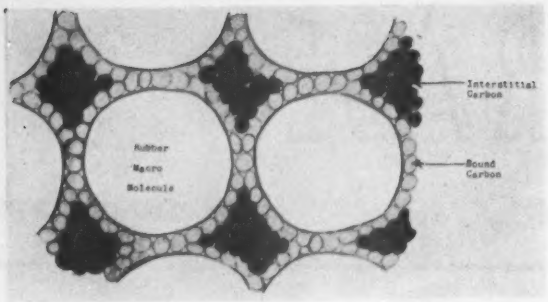

FIG. 1—Early theory of carbon-reinforced rubber phenomena. (Wiegand, 1936).

of the vulcanizate. This picture (Figure 1), while for many years incapable of direct demonstration, still rationalized more carbon-reinforced rubber phenomena than any other concept.

Electron photomicrographs of tread type mixes (Figure 2) are necessarily taken in substantially one plane. As the result of the streaking out during the preparation of this slide these clumps seem to be surrounded by rubber rather than the reverse as pictured by Wiegand. If the picture here presented be extended into the third dimension it is quite apparent that Wiegand's original hypothesis of a two-phase system is supported by the facts.

In Figure 3, which represents a cold rubber tread mix which has been swollen in alcohol and benzene and then spread on a Formvar film for photographing, the interstitial clumps of carbon originally postulated by Wiegand are shown. In this figure the carbon gel unit from which the sol portion has been leached represents the lattices of carbon pictured by Wiegand and the clear areas normally filled with sol rubber are the equivalent of what Wiegand described as macromolecules.

Following the carbon gel concept and the rubber-to-carbon bond through oxygen as described in Part I, the carbon particles, instead of being relatively free floating as described by Wiegand, probably are all attached to one or more rubber chains in the carbon gel complex unit. Either the Wiegand discrete rubber theory or the present concept based on the discovery of the carbon gel complex explains quite adequately the fact that on stretching a piece of tread stock the carbon black particles are pulled out of contact with each other and electrical resistivity goes up sharply. On retraction the carbon black particles attached to the rubber are pulled back into contact and electrical conductivity is restored. Not only does this occur in the vulcanized state but also in the unvulcanized state.

As Parkinson *(2)* has so well described it, the cycle through catenation, dispersion, recatenation and redispersion can be carried on at will. In other words, as the molecules in uncured rubber are stretched by milling, the black particles are pulled out of contact with each other. When, in the next or catenation stage, the raw stock is warmed up, the individual polymer elements seek a lower level of potential energy, i.e., they try to approximate their original coiled configuration. Many of these are attached to carbon black particles and bring the carbon black particles back with them and re-establish contact of carbon particle to carbon particle and hence electrical conductivity.

Going back a step farther, to the mixing and incorporation of the carbon black, it is obvious that the rubber molecules are uncoiled or strained. Simultaneously, carbon-rubber contacts and bonds are also formed. This mix is then set in a strained condition as when, for example, an extruded tread is passed through a water bath. When the tread is heated as during the rise at the beginning of vulcanization the rubber chains retract, relieving their strains, and in so doing pull with them the attached carbon particles aggregating them into electrically conducting clumps as shown in Figure 3. A typical change of resistivity with cure in this way is shown in Figure 4.

It is thus apparent that a particulate dispersion of the carbon black particles is not the ultimate to be desired but merely a means to an end. Mixing must be carried on in such a way that all of the carbon particles become wetted by the rubber. This then permits appropriate steps to be taken for optimum carbon-rubber bonding, i.e., carbon gel formation.

A tire tread stock, for example, must be tough and resist abrasion. But this isn't the whole story as nearly every compounder has learned to his sorrow. It must cushion the load it carries against a rapid-fire succession of impacts. No simple, rigid member, such as a spring, for example, can be devised to take up and cushion these shocks right at the road surface while providing traction at the same time. To date the best answer to this problem has been the coiled-up rubber molecules reinforced or knitted together by carbon and sulfur.

At present it is possible to arrive by trial and error alone at the amount of rubber-carbon bonding which represents the optimum. Dispersion is an essential part of this, not as an end but rather as a means to an end. Milling at adequate viscosity generally suffices to produce complete dispersion of the black but it does not guarantee wetting of the black by the rubber nor the proper formation of carbon gel. Dispersing or wetting agents added to the black or to the mix to act on the black have, on the whole, failed to produce any beneficial results. *It is our belief in the light of our present knowledge that more can be accomplished by treating or modifying the rubber to make it receive the carbon.*

Carbon Gel in the Factory

The simpler facts of carbon gel having been demonstrated there remains the question of its application in tire treads and, similarly, in other applications of carbon reinforcement. This has been discussed for the GR-S (styrene) type polymers in a number of papers from

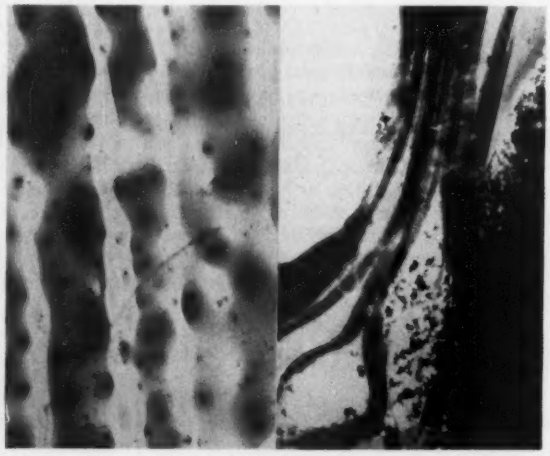

FIG. 2—Dispersion in LTP mixed at high temperature. (7,500X).

the Columbian Carbon Company Laboratories. Although the concept evolved from work with cold rubber, it was shown later that the carbon gel idea could advantageously be applied to natural rubber *(3)*. In the case of LTP (Low Temperature Polymer), control of mixing temperature (both minimum and maximum) provided a proper balance between wear and flex-crack resistance. This is now approved practice with GR-S type rubbers. For natural rubber, however, hot mixing alone did not increase modulus but a high loading masterbatch of black (75-80 phr—pounds per hundred of rubber) hot mixed was needed. Tire treads so processed outwore top quality LTP treads which are generally conceded to outwear the best channel black-Hevea treads.

The Older Art

Hot processing of channel black-Hevea treads is not new. Gerke (U.S. Patent No. 2,118,601) milled carbon black into Hevea at high temperature (effecting what in mill room parlance is described as a carbon black scorch), and without removing the batch from the mill or dropping the mixing temperature, milled out the scorch. After a rest the balance of the compound was added. This gave a stock softer at low elongations but stiffer at high elongations than the control. Hysteresis was lowered and the resistivity of the stock did not show the usual drop during vulcanization. Gerke pictured an end product in which the black was particulately dispersed and hence had high resistivity. Substantial improvement in road wear was claimed.

Bradley (U.S. Patent No 2,239,659) had a slightly different approach and philosophy. A channel black-Hevea masterbatch was prepared at the then conventional temperature and the mill sheeted stock was subjected to a static heat treatment, or scorch, in steam in an autoclave or in air in an oven. Temperatures of the order of 300°F. were prescribed, as well as adding rubber (to dilute the batch) and the conventional softeners and curatives at conventional temperatures (200 to 250°F.). The same effects on physical and electrical properties and on road wear were claimed, but Bradley pictured a two-phase system in his end product, viz., clumps of highly pigmented tough rubber dispersed in a matrix of rubber with relatively less carbon reinforcement. This view he supported with photomicrographs.

The Columbian approach differs from both of these

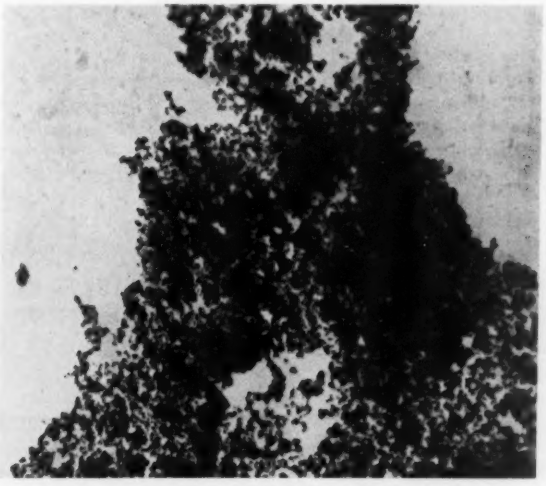

FIG. 3—LTP carbon gel. (7,500X).

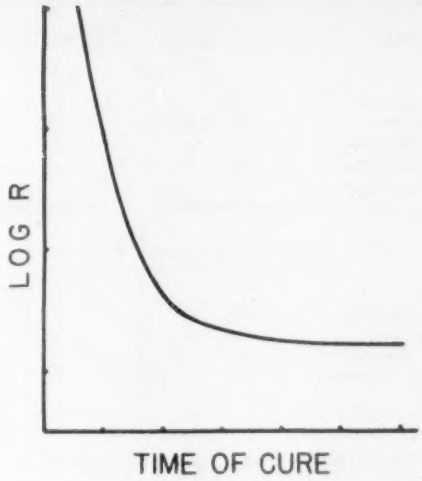

FIG. 4—Typical change of resistivity with cure.

but combines some of the features of each. A high (75 to 80%) carbon-to-rubber masterbatch (softener added) is prepared at high temperature and is discharged from the Banbury as soon as mixed. After cooling, the diluting rubber and the curatives are added at conventional temperatures. As in the Gerke method, the scorch or carbon gel formation occurs at high temperatures and during grinding. Unlike Gerke's method, a high black to rubber ratio is needed. Like Bradley's method, a high black master is used in a preliminary step and later diluted, but unlike Bradley, scorch or gel formation occurs while the batch is being worked.

In order to make a direct comparison of the three methods a series of compounds were prepared in the laboratory as follows:

(1) A control method—rolls 6 x 12-inch, mixed with 130°F. water circulating.
(2) The Gerke method.
(3) The Bradley method.
(4) The Columbian method.

Three carbons were used in each, viz.:

(1) EPC, impingement carbon made from gas (10.5 acres, pH 4.5).

(2) FF, furnace carbon made from gas (7.5 acres, pH 8).

(3) HAF, furnace carbon made from oil (11 acres, pH 8).

The compounds used were:

FOR THE CHANNEL CARBON

Smoked Sheets	100.0
EPC	50.0
Zinc Oxide	5.0
Stearic Acid	4.0
Pine Tar	3.0
MBT	1.2
Sulfur	2.8

FOR THE TWO FURNACE CARBONS

Smoked Sheets	100.0
Furnace Carbon	50.0
Zinc Oxide	3.0
Stearic Acid	2.0
Pine Tar	3.0
Refined Wood Resin	3.0
Antioxidant	2.0
Benzothiazyl sulfenamide	0.8
Sulfur	2.25

TABLE I—MOONEY VISCOSITY (FINAL TREAD)

Carbon	EPC	FF	HAF	Average
Control Method	37	31	40	36
Gerke Method	19	13	22	18
Bradley Method	31	24	29	28
Columbian Method	24	23	35	27

TABLE II—CARBON GEL

Carbon	EPC	FF	HAF	Average
Control Method	47	42	47	45
Gerke Method	54	47	53	51
Bradley Method	61	54	58	58
Columbian Method	54	46	51	50

TABLE III—ELECTRICAL RESISTIVITY (LOG R)

Carbon	EPC	FF	HAF
Control Method	6.6	4.2	2.5
Gerke Method	>10.4	>10.4	5.9
Bradley Method	>10.4	>10.4	7.6
Columbian Method	9.9	7.6	4.2

TABLE IV—REBOUND

Carbon	EPC	FF	HAF	Average
Control Method	65	72	65	67
Gerke Method	74	78	72	75
Bradley Method	75	80	76	77
Columbian Method	74	78	71	74

TABLE V—SHORE HARDNESS AT FIXED CURE

(40 Mins. @ 280° F.)

Carbon	EPC	FF	HAF	Average
Control Method	59	57	62	59
Gerke Method	52	51	58	54
Bradley Method	55	52	58	55
Columbian Method	57	54	60	57

A single lot of premasticated and blended No. 1 smoked sheets was used throughout. The following procedures were observed:

For the Control Method: Water at 130°F. was circulated through the 6 x 12-inch laboratory mill rolls. The batch was completed in a single milling operation lasting 16 minutes.

For the Gerke Method: The laboratory Banbury was preheated to give a masterbatch temperature of 340°F. Fifty parts of black were added in two increments to 100 parts of rubber in 2 minutes and the batch run at 340°F. for another 28 minutes, for a total of 30 minutes. After cooling overnight the balance of the compound was added on an open mill.

For the Bradley Method: On an open mill 67 parts of black were added to 100 parts of rubber holding stock temperature to 200 to 225°F. Total time, 15 minutes. The sheeted stock was then heated for 2 hours at 300°F. in an oven with a nitrogen atmosphere. After a rest and cooling the masterbatch was put back on the mill with 100°F. water circulating. Diluting rubber and all other ingredients were added.

For the Columbian Method: The Banbury was employed using preheat to give a stock temperature of 370°F. Masterbatches were prepared as follows:

For EPC, 75 parts phr. + pine tar.
For FF, 80 parts phr. + pine tar.
For HAF, 75 parts phr. + pine tar.

Total masterbatch mixing time, 10 minutes. After cooling, the masterbatch was returned to the Banbury with cooling water at 140°F. circulating through the case and rotors, and the diluting rubber and other ingredients were added. Total time, 7 minutes.

Significant data for the four methods on the three types of carbons, including Mooney viscosity, carbon gel, electrical resistivity, rebound, and Shore hardness, are shown in Tables I to V, respectively.

Stress-strain curves were generated on a Scott tensile tester in the conventional manner and after relaxation. For these latter the specimen was prestretched as follows:

2 times to 200% elongation
3 times to 300% elongation
5 times to 400% elongation

On the 11th stretch stress values were recorded and calculated on the original bench marks. This is a technique similar to that described by the author in 1944 *(4)*.

In Figure 5 a typical family of stress-strain curves for the complete set of cures is given. It will be noticed that at the shortest or undercure there is much plastic flow and not much strength. (The resilient reticulum has not yet become co-extensive with the specimen). As sulfur combines or more rubber-sulfur bonds are formed the stock tightens up, as illustrated by the reduced elongation at fixed stress (e.g., 3000 p.s.i.).

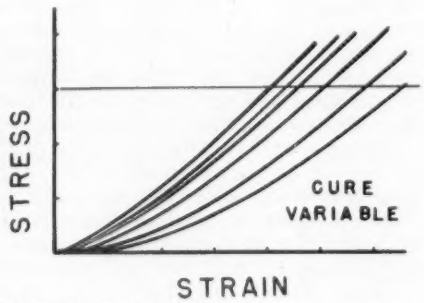

FIG. 5—Typical family of stress-strain curves for the complete set of cures.

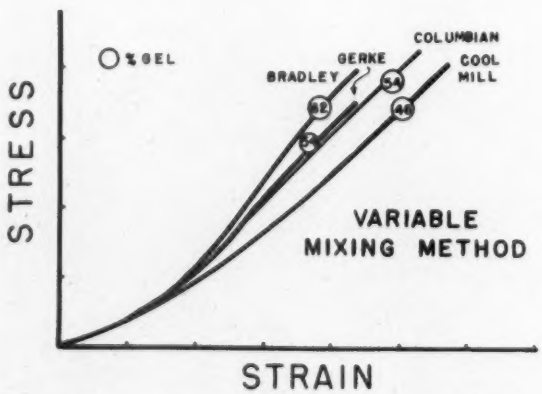

FIG. 6—Similar family of curves for the four mixing methods used.

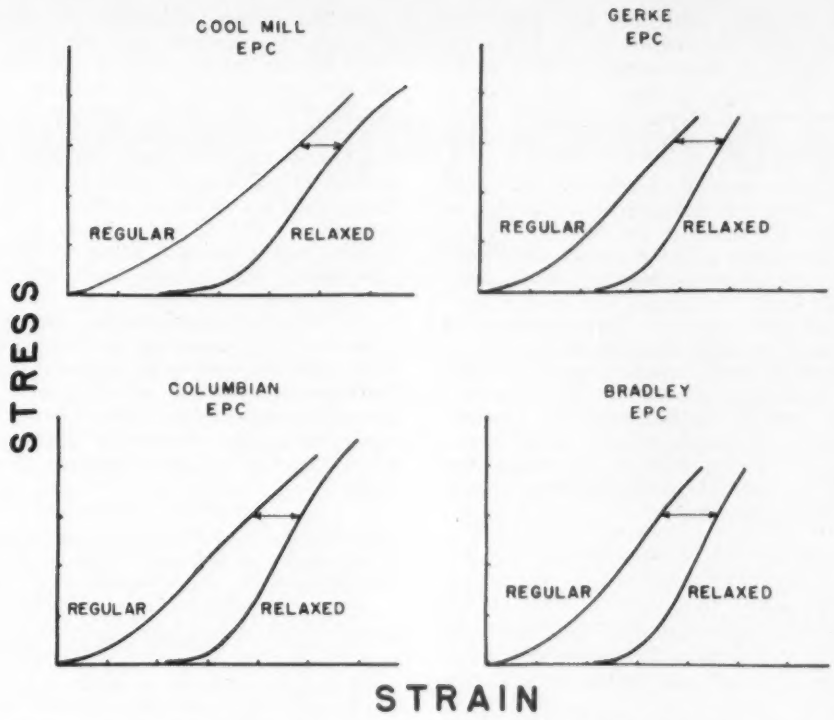

FIG. 7—Normal and relaxed stress-strain curves for EPC by the four mixing methods used.

In Figure 6 is given a similar family of curves for the four mixing methods used. The tightening of the rubber as the carbon gel level is raised is apparent. This suggests that as the carbon gel lattice is enhanced the strengthening or tightening of the rubber is of the same kind as that produced by increasing cure. This agrees with the results shown in Figures 8 and 9 in Part I by Sweitzer where no sulfur was present, and adds further support to the view that the rubber-to-carbon bond has at least a strong chemical component.

In Figure 7 are shown normal and relaxed stress-strain curves for one of the carbons by the four methods of mixing described. Using the increased strain at fixed stress (3000 p.s.i.) as a means of measuring relaxation it is seen that the relaxations are in the order of the carbon gel contents. There might be a temptation to claim that the rubbers with the higher gel content relax more but it must be borne in mind that these stocks, because of their higher modulus, had more work done on them. At this juncture, therefore, it is not safe to say more than that relaxation effects are of the same order throughout.

Preferred Method of Hevea-Carbon Gel Enhancement

In Table VI the three hot processing methods are compared with the conventional cool mill mixing method. In all three cases the amount of carbon gel is increased; likewise modulus and rebound. There are, however, significant differences.

Gerke, who uses a hot mill to "mill in" and "mill out" a carbon scorch, suffers a drastic loss in tensile and loses electrical conductivity. This, it is believed, results from the fact that having formed an increased amount of carbon gel the free ends of the bound rubber molecules and the sol rubber are torn up or degraded so that the carbon gel units are wrapped up in low molecular, unpigmented rubber, resulting in a serious loss in tensile and electrical conductivity. The extent of this degradation of the rubber is indicated by the halving of the Mooney viscosity as compared with the cool mill mixed control.

Bradley produces his extra gel by static heating. During the temperature rise he gets the catenation of carbon particles, to use Parkinson's expression. When the black is so closely clumped and in contact the Bradley masterbatch is subjected to a heat treatment which produces a very tight, impenetrable carbon gel. This, on the addition of the diluting rubber, is torn up into pieces so large as to be discernible in the light microscope and wrapped up in the diluting rubber. Thus, Bradley also loses electrical conductivity and places an undue strain, flexwise in service, on his diluting rubber.

In the Columbian method, on the contrary, the black at higher than final concentration is lodged in the rubber and bound to it not in tight clumps but in a more extended array along the length of the polymer chains.

TABLE VI—SUMMARY OF PROPERTIES AS CARBON GEL IS VARIED

(Average of 3 Carbons)

Mixing Method	Cool Mill	Gerke	Bradley	Columbian
% Carbon Gel	45	51	58	50
Mooney	36	18	28	27
L-300 (p.s.i.)	1560	2100	2200	2025
Tensile (p.s.i.)	3990	3830	4070	4140
Rebound	67	75	77	74
Log R	4.4	>8.9	>9.4	7.2

On dilution, the new rubber penetrates the carbon gel of the masterbatch. This is evidenced by the relatively small increase in log R. In other words, by the Columbian method there has been a minimum disturbance in the basic (or control) spatial arrangement of the carbon in the rubber, but primarily an increase and strengthening of the carbon gel lattice.

In all three cases the amount of free or lightly pigmented rubber is increased, resulting in an increase in rebound. In the case of both Gerke and Bradley this free rubber is outside the carbon gel units. In the Columbian method it is the inside phase, analagous to the resilient core of a golf ball inside its tough cover, which cover has the impact and tear resistance. The advantages of this system have been repeatedly demonstrated in service, as pointed out earlier. Hevea treads made with VFF carbon and the Columbian gel method have outworn the best cold rubber treads. In heavy-duty tires, where coarser carbons have to be used because of the hysteresis problem, FF carbon incorporated by the Columbian method has maintained its cool running behavior without the usual penalty in wear or flex.

Summary

It has been shown that:

(1) A homogeneous particulate dispersion of carbon black in rubber is contrary to the very nature of the two materials and unsuitable for best performance, in tire treads, for example.

(2) Treatment of the rubber rather than the carbon seems indicated for increased reinforcement.

(3) The carbon gel complex is the working element in the development of toughness, wear and resilience.

(4) In the butadiene-styrene copolymers, control of mixing temperature, both as regards minimum and maximum, is sufficient for optimum gel development.

(5) In Hevea rubber further steps are necessary. A comparison of the Gerke, Bradley and Columbian systems of carbon gel development shows that: (a) Gerke makes a carbon gel lattice and destroys it by overmilling; (b) Bradley makes such a tight lattice that he tears it up on addition of diluting rubber; (c) Columbian forms a more open lattice into which the diluting rubber can be put.

(6) Sufficient experience has been gained in service to warrant recommending the Columbian approach.

(7) Hot processing of rubber-carbon mixes, when intelligently applied, is no longer to be dreaded but is one of the compounder's most effective tools for producing better quality whether the polymer be the Buna or GR-S type synthetic or the natural variety.

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Keeping Compressed Air Lines Tight Pays Dividends

MAXIMUM benefits of compressed air are secured by manufacturers who keep a close vigilance over their air systems. Conversely, where reasonable maintenance is not conducted, a loss in production and dollars is experienced. For example, air motors are generally designed to operate within working pressures of 90 and 110 psig. An air motor built to operate at 90 psig. will lose 25% of its capacity if line losses in delivering air drop the pressure to 70 psig. The following data, supplied by the Compressed Air and Gas Institute, indicates the importance of properly maintaining air distribution systems:

First inclination when air pressures drop may be to place the blame on insufficient compressor capacity. A check of the air distribution system, first, may save the cost of new compressor equipment.

One of the principal causes of low-air pressure are leaks in the distribution system. Checking the air distribution system for leaks is a relatively simple matter. Results have proved that the most likely location of small leaks are around valve stems, hose connections, unions, drains, home-made blow guns, and lines leading to inoperative tools. Of course, the entire system should be checked with particular attention to the above and to lines which are subjected to unusually rugged treatment. Inspections should be made monthly.

Plant maintenance departments have come up with many simple and rather unique ways to check leaks. Most frequently used are the lighted candle or the solution of soapy water which is brushed around suspected areas. One manufacturer puts essence of peppermint into the air system. Detection of the slightest leak is by odor. Still another method, rather ingenious, is the use of what heretofore may have been considered nothing more than a youngster's toy. A small siren-like whistle, activated by air flow, is passed over the lines, a siren noise indicating a leak. Regardless of what method is adopted, when leaks are found, patch them immediately.

Some of the leaks may be very small, appearing trivial in themselves. But such leaks may be numerous and have a high accumulative effect. Actually, these leaks spell a very definite dollar loss as shown in the accompanying table. This dollar and cents wastage more than justifies scheduled maintenance of air distribution systems.

COST OF AIR LINE LEAKS

Size of Opening (Inches)	Air Lost (cu. ft. per month at 100 psig. based on nozzle coefficient of 0.65)	Cost of Air Lost ($0.07 per 1000 cu. ft.)
3/8	6,671,890	467.03
1/4	2,920,840	204.46
1/8	740,210	51.81
1/16	182,272	12.75
1/32	45,508	3.19

Studies of Thermosetting Polyvinyl Alchohol Systems

By C. F. BROWN

Department of Chemistry, Bethany College, Bethany, West Virginia

VINYL compounds may be described as derivatives of ethylene and contain the characteristic grouping $CH_2 = CH—$. Vinyl alcohol is unknown, since on formation it immediately rearranges to give acetaldehyde *(1)*. However, its polymer, polyvinyl alcohol, is well known, as are the polymer derivatives such as acetates and acetals.

PVA is usually produced by the hydrolysis of an ester such as polyvinyl acetate. The molecular weight of the corresponding alcohol is thus largely determined by the molecular weight of the starting ester, although the chain length seems to be less than that theoretically expected *(2)*. By controlling the degree of hydrolysis the percentage of hydroxyl groups, referred to ester, may be varied from a few percent to almost 100% *(3)*. Thus, compounds may be obtained which exhibit properties of both ester and alcohol in the same molecular structure, but which properties are not given by mixing ester and alcohol as separate components to give the same ester: hydroxyl ratio in the mixture.

Polyvinyl alcohol or its partial esters may be plasticized by water-soluble hydroxyl-containing compounds of high boiling points. Examples of such are glycerol, triethylene glycol, butylene glycol, triethanolamine, and ethanolacetamide. Other plasticizers are known, such as lactic, acetic, glycollic and phosphoric acids.

When properly plasticized and/or treated, PVA and its partial esters have many uses, among which are textile and paper treatment, synthetic fibers, gaskets, belting, hose, emulsifying agents, and many miscellaneous applications *(4)*.

The greatest disadvantage of polyvinyl alcohol for most applications is its water sensitivity. Various methods have been tried to reduce this sensitivity, including treatment with agents such as tannic acid, dichromates, etc. *(4)*. However, these treatments are not generally suited to the production of thermosetting compositions such as used in molding operations. A process for the thermosetting of PVA systems has been reported *(5)* and this work is a study of some of such systems.

Preliminary investigation of various partial esters of PVA showed that acetate ester of high molecular weight containing approximately 50% hydroxyl was quite heat sensitive and readily plasticized. Primarily for these two reasons this PVA grade was selected for principal studies and data herein presented are for this grade unless otherwise specified.

Preparation of Samples

The PVA resin was placed in a suitable vessel and covered with alcohol containing the requisite plasticizer. This mix stood overnight, was then removed from the container and the alcohol allowed to evaporate at about 50° C. The remaining alcohol was removed when the batch was fluxed on a hot mill. The stock was rolled from the mill and kept rolled to insure even distribution or diffusion of plasticizer. Various fillers, etc., were added on the mill at a temperature sufficient to keep a smooth sheet on the roll after the manner of rubber compounding, the $PbCrO_4$ going in first and the chloranil last.

Stocks were cured in cellophane-lined molds, for the times shown in the accompanying tables, at 287° F. (40 lbs. steam) and generally removed from the mold without cooling. Test samples were conditioned 24 hours in a room at 25° C. and standard ASTM tensile tests run at the same temperature. All other tests were at 25° C. also because of the extreme sensitivity of the PVA compounds to temperature changes.

Note: This paper was presented before the 12th International Congress of Pure and Applied Chemistry, New York, N. Y., September 10, 1951.

TABLE I—VARIOUS PLASTICIZERS

(Cure: 15 Mins. @ 287°F.—Removed hot)

Formula	BA	BB	BC	BD	BE	BF	BG	BH
PVA Resin (50%)	100	100	100	100	100	100	100	100
Glycerol	67	—	33.3	—	—	33.3	33.3	—
Triethylene glycol	—	67	33.3	—	—	—	—	—
2-Methoxy Methyl 2-4 diMe pantanediol 1-5	—	—	—	67	—	—	—	—
Triethanolamine	—	—	—	—	67	—	33.3	—
Carbowax 1500	—	—	—	—	—	33.3	—	—
Sorbitol	—	—	—	—	—	—	—	67
$PbCrO_4$	16	16	16	16	16	16	16	16
Chloranil	8	8	8	8	8	8	8	8
Elongation at Break	425	200	450	500	500	375	500	Too Hard
Tensile (psi)	880	270	400	250	400	440	110	
Hardness (Shore A)	55	36	35	35	46	45	35	100+

TABLE II—EFFECTS OF CURATIVE

(Cure: 30 Mins. @ 142°C. — Cooled in press before removal — Test Temperature, 22°C.)

Formula	BR	BS	BT	BU	BV	BW	BX	BX-1
PVA Resin (50%)	100.0	100	100	100	100	100	100	100
Glycerol	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3
Triethylene Glycol	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3
$PbCrO_4$	16	16	16	16	16	16	16	16
Chloranil	0	1	2	4	6	8	12	16
Elongation at Break	600	625	625	625	625	550	400	200
Tensile (psi)	350	500	550	850	970	1000	960	150
Hardness (Shore A)	35	35	35	34	35	40	36	35

Various Plasticizers

Preliminary work indicated a mixture of glycerol and triethylene glycol plasticized the PVA resin satisfactorily, but a series of plasticizers was studied, as shown in Table I, to determine those most suitable for general use.

From the data, a mixture of equal parts of glycerol and triethylene glycol gave highest tensile and elongation at lowest hardness for the plasticizers tested. The combination was selected for use in future work with the PVA resins.

Triethanolamine gave porosity in the sample while glycerol alone gave relatively poor plasticization. Sorbitol was least satisfactory of the attempted plasticizers, indicating that liquid plasticizers with lowered hydroxyl content and increased water sensitivity are perhaps most satisfactory as a class for plasticizing PVA resins.

Effects of Curative

Eight parts of chloranil had been taken arbitrarily with 16 of $PbCrO_4$ per 100 of PVA resin. To study the effects of chloranil as the "curative," or thermosetting agent, a series of mixes was made as shown in Table II.

Fig. 1 indicates that 8 parts of chloranil are about optimum, while 16 parts show greatly decreased tensile. The 16-part mix was quite "short," indicating decomposition of the resin composition, which corresponds to overcure in rubber.

The mix without chloranil (Formula BR) did not thermoset, and had to be cooled in the press before removal from the mold was effected. This establishes chloranil as the thermosetting agent and not $PbCrO_4$.

Curing Time

Since chloranil behaves in PVA seemingly analogous to sulfur in rubber, optimum curing times had to be established. Formula BW from Table II was cured at 287° F. for various time intervals with the results shown graphically in Fig. 2.

From Fig. 2, it is seen that 15 minutes at 287° F. is on the optimum part of the curve. The curve is flat over an extended period indicating that overcure is not readily effected. Length of cure for tensile is not as vital as amount of curative (Fig. 1). Elongation of the sample decreased with length of cure, but was still satisfactory after 2 hours heat. Apparently, Formula BW has a wide latitude in its resistance to "over-setting."

Effect of Temperature on Tensile

During the course of the work large variation was noticed in the tensile values of the same sample. Temperature effects were suspected and a series of tensile tests were run at various temperatures as shown in Fig. 3.

The extreme sensitivity of the PVA compositions to temperature changes is quite evident. The temperature of the test room could readily be maintained at 25° to 26° C. and this was done throughout the series of work reported herein, which included rechecking of work previous to the temperature study.

Tensile strength was changed approximately 50 psi for each degree change in temperature.

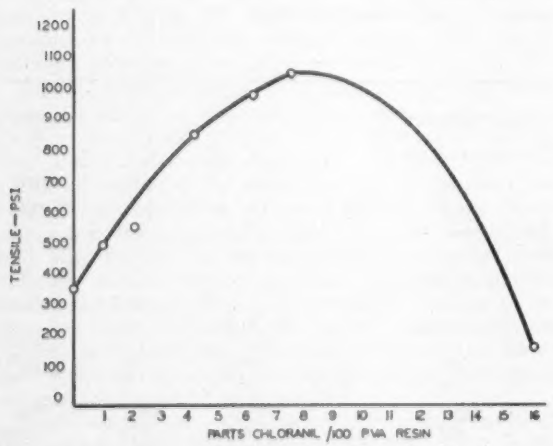

FIG. 1—Effects of curative.

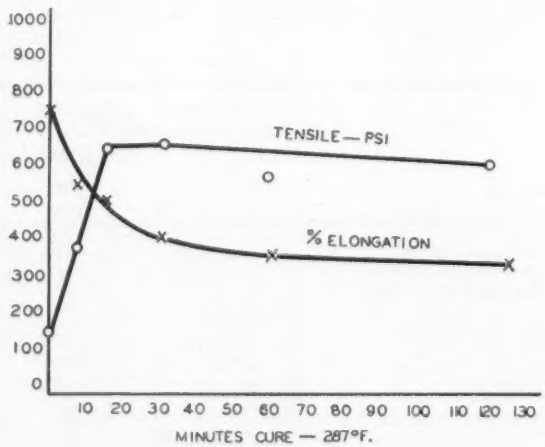

FIG. 2—Curing time—Formula BW.

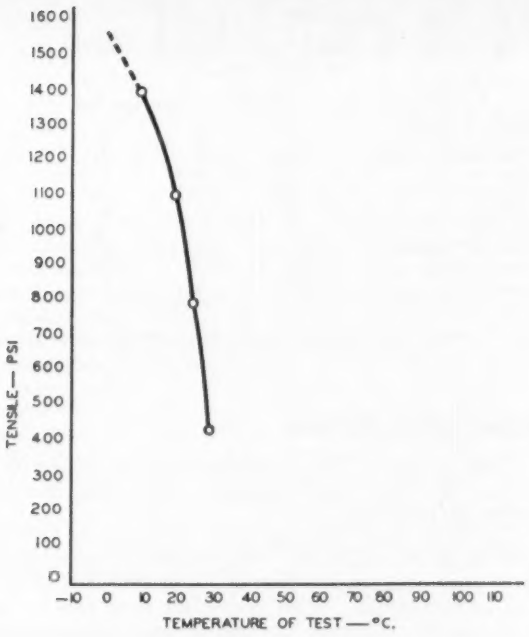

FIG. 3—Effects of temperature on tensile.

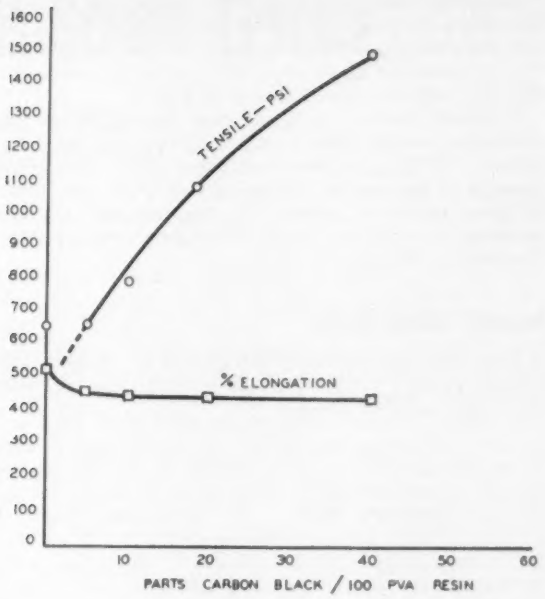

FIG. 5—Effects of carbon black.

Grades and Effects of Carbon Black

Since PVA seems to resemble rubber in certain of its curing characteristics, perhaps carbon blacks would have definite effects on the physical properties of the cured material. Several grades of carbon black, ranging from a soft black to high reinforcing black, were compounded and cured in a base mix (Formula BW) with the results shown in Fig. 4.

Data shows the blacks to give decided increase in tensile with the reinforcing black having most effect, and ink black least. Elongation was relatively unaffected by any black.

To study the effect of black content, a reinforcing black (Kosmobile 77) was varied in the base mix (BW), cured 15 minutes at 287° F., with the results shown in Fig. 5.

Five parts of black had no effect, but from this point the tensile seemed directly related to the amount of black present, the tensile being doubled with 40 parts black per 100 PVA resin.

Elongation was relatively unaffected, but Shore A hardness increased directly from 36 for the BW base to 62 for the 40 parts black.

Effects of PBNA

Fisher believes that HCl results during the process of curing rubber with chloranil *(6)*. This is also apparent in the present curing of PVA resin with chloranil as seen in the etching of the unprotected mold, and ready formation of AgCl from $AgNO_3$ at the surface of the cured sample.

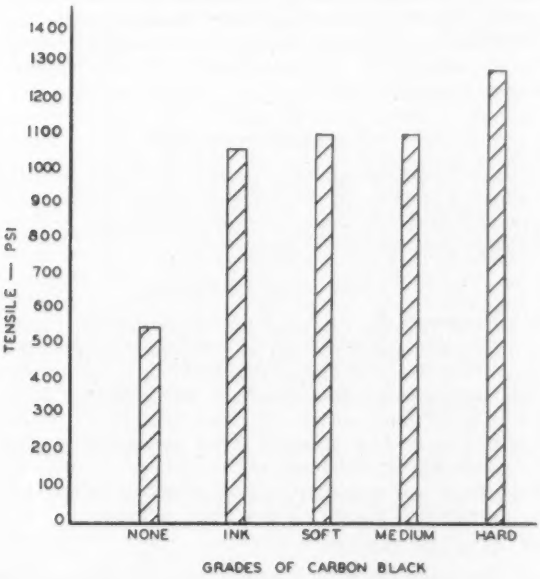

FIG. 4—Grades of carbon black.

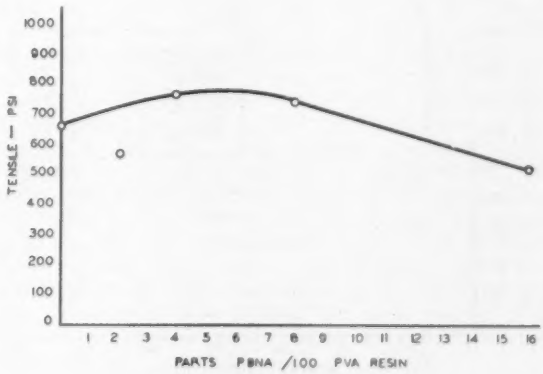

FIG. 6—Effects of PBNA.

Acceptors such as amines might absorb the HCl and thus affect the properties of the cured composition. To test this condition PBNA (phenyl-beta-naphthylamine) was compounded in the base BW, cured 15 minutes at 287° F., with the results shown in Fig. 6.

A definite increase in tensile was shown but not of a spectacular nature, with 5 parts PBNA giving maximum tensile. At 16 parts, there was experienced considerable porosity in the sample, indicating that gases are formed in some unknown manner by the presence of large amounts of PBNA. Repeated experiments confirmed the porosity observation.

Proposed "Optimum Formula"

From the data showing the effects of various components in the PVA composition the following "optimum formula" was compounded:

PVA Resin (50%)	100.0
Glycerol	33.3
Triethylene Glycol	33.3
Reinforcing Black	25.0
$PbCrO_4$	16.0
PBNA	5.0
Chloranil	8.0

Twenty-five parts of black were used in preference to 40 to keep the hardness down and reduce to a minimum the possible effects of temperature on the harder composition. The mix was cured at 287° F. for varied time intervals with the results shown in Fig. 7.

Maximum tensile was practically attained in 30 minutes as compared with 15 minutes for the base mix BW shown in Fig. 2. In both cases, the curing curves are flat showing a wide latitude of curing time for both compositions. Apparently the several ingredients of the "optimum formula" exert their independent or additive effect, giving a tensile of 1320 psi as against 1260 psi for the base mix containing 25 parts of reinforcing black, and 660 psi for the base BW containing only curatives. However, the increased tensile of the "optimum formula" was obtained at the expense of 100% increase in curing time over the carbon black mix.

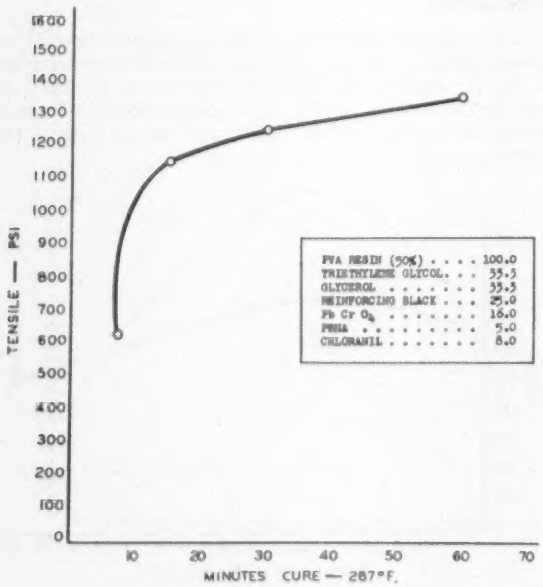

FIG. 7—Cure of "optimum" formula.

TABLE III—EFFECT OF HYDROXYL CONTENT OF PVA RESINS

(Cure: 15 Mins. @ 287°F. — Removed hot)

Percent (OH)	50	88	88	99+
PVA Resin	100.0	100	100	100
Glycerine	33.3	33.3	33.3	33.3
Triethylene Glycol	33.3	33.3	33.3	33.3
$PbCrO_4$	16	—	16	16
Chloranil	8	—	8	8
Elong. at Break	525	200	200	—
Tensile (psi)	660	1500	1320	—
Shore A	36	82	76	—

Hydroxyl Content of PVA Resins

Three grades of PVA resin containing 50, 88 and 99+ percent hydroxyl were compounded in a base formula, shown in Table III.

The 50% resin handled very satisfactorily but the 88% resin gave difficulty. Very high milling temperatures were required for fluxing and at 200° F. the sheet was quite roughed. Flow properties were poor in the mold and the hardness was high in the cured samples. The "cured" 88% hydroxyl sample without curatives gave severe bleeding of plasticizer, while that with curatives gave no indications of bleeding. Apparently the curatives exert some unknown effect in the composition to bring about retention of plasticizer with reduction of tensile and hardness.

The 99+% resin could not be mixed and handled by the procedures of the present work and so was not evaluated. Other techniques are evidently necessary for handling the higher hydroxyl resins.

Thus, in the present work we find that the chemical agents $PbCrO_4$ and chloranil used by Fisher in the non-sulfur vulcanization of rubber will give thermosetting or "cured" PVA resin compositions that may be removed from the mold at curing temperature. Properties of the compositions may be affected by plasticizers, curing time, various amounts of curative, carbon blacks, and amines such as PBNA. The PVA resins having approximately 50% hydroxyl content seem to handle best, and to give cured products having characteristics closely resembling those of cured rubber.

ACKNOWLEDGMENT

Grateful acknowledgment is made to the United States Rubber Company in whose laboratories the work was initiated and for their very helpful review and suggestions concerning the manuscript.

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The Errors of Stress-Strain Testing

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IT HAS been recognized for many years that the measurements of tensile strength, elongation at break, and modulus at 300% extension of a rubber compound have been subject to substantial errors, which frequently are so large as to place considerable doubt on the results. These measurements have been an important part of the specification of many rubber stocks, however, and so the users of these tests have been reluctant to disregard them. Rather, they have attempted to increase the reliability of the results by refinements in the test procedure and the adoption of schemes calculated to accept the "best" result from the data. As a last resort, irregular and imprecise results have been excused by the statement that, though laboratory tests are not too reliable, they must be made, because any result is better than no result.

Establishment of Test Procedure

One of the earliest attempts to improve the test results by better control of the test procedures was made by the committee appointed by the American Chemical Society in October, 1926 *(1)*. This group recognized the importance of the ambient temperature and humidity at the various stages of the test procedure, and of the extent to which the compound was alternately worked and allowed to rest. Their study and recommendations seem to have been the guiding principles of the Committee on Specifications set up by the Office of Rubber Reserve in 1942, who set the specifications for GR-S. In 1944 the Compounders Committee of Rubber Reserve suggested that the test data would be of use to the customer and requested that the data be given with each lot of rubber produced. It has been for some time our contention that the figures obtained on the stress-strain tests were essentially meaningless, and, in fact, could be misleading, and thus of more harm than value to the customer.

The controls imposed on the test procedures by the Committee on Specifications are given in detail in their manual. In general, these controls govern the taking of the sample, the recipe, the weight tolerance of the ingredients, the size of the mill, the roll temperature, the mill opening, the time and method of milling, the order of addition and time of addition of compounding ingredients, the resting periods, the remilling procedure, the preparation of mold blanks, the dimensions and materials of the mold, the press temperature and pressure, the mold preheat time, the time of start and finish of cure, the dieing of the dumb-bell, the printing of the benchmarks, the determination of sample cross section, the aging of the sample, the temperature and humidity of the test room, the design and operation of the die, marker, and tensile machine, and the calibration of the tensile machine. The specifications appear to be satisfactorily complete, and yet the standard deviations of the stress-strain test on GR-S (RRC recipe) were approximately:

Tensile Strength	(50′ cure)	200	p.s.i.
Elongation	(50′ cure)	30	percentage points
Modulus at 300% elongation	(25′ cure)	35	p.s.i.
	(50′ cure)	40	p.s.i.
	(90′ cure)	45	p.s.i.

These figures of the test deviation are indicative only, as they are averages of the deviations found in a number of investigations. They indicate, however, that if the results of daily tests on a uniform lot of rubber are grouped by months, the tensile strength will show an average spread of results of approximately 818 p.s.i., and the modulus at optimum tensile an average spread of approximately 175 p.s.i. With the slope of the modulus curve found in the standard test recipe, this spread of results from day to day in one month due solely to test error would be equivalent to a 15-minute error in the estimation of cure time. Since these deviations were considered to be too large for practical use to be made of the results, a program of test improvement was initiated with the aim of reducing them.

Changes in Test Procedure

The first phase of the test procedure examined was the milling and mixing conditions. These seemed to be precisely established, but an improvement was made in the roll temperature control by mounting a water heating chamber on the mill to control the temperature of the roll cooling water. The water temperature was kept relatively constant by the controlled addition of steam. In addition, the temperature of the rubber mix was measured with a needle pyrometer after the addition of the black and again after all ingredients had been dispersed. The carbon black was deliberately measured out two grams overweight (½% of the weight of the black) to compensate for the usual two gram loss during milling. This excess was only one-half of the allowed weight tolerance.

The Scott Tester was modified by eliminating the burning point guide rods and suspending the point on a wire from the ceiling. At the same time the glass-shielded point, which gives a smaller, more precise hole, was adopted. The Tensilgram was discarded and replaced by a sheet of paper with only a zero line on it. The distance through which the burning point moved was measured in fiftieths of an inch and related directly to the force in pounds. The machine was calibrated once a month by weights, which were rested on a pan mounted on the lower jaw and applied to the machine at the normal rate of jaw travel through dumb-bell strips cured for 25, 50 and 90 minutes. To minimize drag, the pawls were raised until the modulus determination had been made, and then lowered. The pawl drag was found to be equivalent to approximately 15 p.s.i. In addition, the pawls and the grooves on the quadrant were frequently polished with crocus cloth, and new quadrants were remachined before being put into service. The head bearing was dismantled and cleaned at least once every month.

The curing presses had been shielded by enclosing them in tent-shaped steel constructions with walls of

Note: This article is based on a talk given by Mr. Bowell before the Rubber Chemistry Division, Chemical Institute of Canada, Montreal, Canada, June 4, 1952.

light gauge steel and 2 inches of asbestos fiber insulation. Molds were inserted and removed through a small rising and falling door of the same construction as the sides. The temperature was recorded and controlled by a Taylor proportioning controller.

The control system was not changed, but a thermometer block roughly one-half the size of the mold was built and placed permanently in the lower daylight of the press. Eimer and Amend thermometers, No. 15-165, were immersed in mercury in holes bored in the block. A small double window was installed in the door, and the thermometers were read by means of a flashlight and telescope mounted on a laboratory stand. By this system the temperature could be read at any time to within 0.1° Centigrade. These temperatures were checked by thermocouples mounted in the inner surfaces of a mold in which rubber was cured, and read through a Leeds and Northrup No. 8662 potentiometer. The thermometers were calibrated once a week against a standard thermometer calibrated by the National Bureau of Standards. One press was segregated for each curing temperature used, to eliminate adjustment of the control system once it was set. Parallel steam flow through the platens was adopted for each press.

A hydraulic-driven punch press was built to die the dumb-bell specimens from the cured sheet. The dies were built to our design, and consisted of strips of razor blade steel clamped and constrained to a dumb-bell-shaped block with a ¼-inch center section. This gave positive control of the width of the test strip. The blades were discarded when dull. The ¼-inch width of the test specimens was checked by a travelling microscope. Thickness was checked on the customary Randall and Stickney gauge. A pronounced variation in thickness of the specimens was found to be caused by variation in the weight of compound loaded in the mold. Accordingly, a fixed weight was adopted for mold loading of the compound.

Testing of a standard batch of rubber once a day for a period of one year showed that the results cycled through a considerable amplitude between fall and winter testing and spring and summer testing. This was ascribed to the effect of humidity during the mixing of the compound, analagous to the effect of moisture variations described by Rush and Kilbank *(2)*. Attempts made to eliminate this effect by conditioning of polymer and pigments were not too successful, and finally a 6x12-inch mill was installed in a humidity- and temperature-controlled room, where all mixing and testing of production samples is now done. This eliminated the seasonal trends in the test results.

Finally, improvements were attempted on the method of calculating the "correct" results from the data. We had previously adopted and discarded in turn the practices of averaging the results from the two strips with highest tensile strength, of averaging the results from three strips if they were all within a suitable range, and of averaging the results from five strips. An examination of our data showed that a more reliable method, particularly if there were any faulty strips, was to take the median of five strips. At present, we take the median of three strips if the values are within certain preselected ranges, according to the procedure recommended to the Committee on Specifications by Churchill Eisenhardt of the staff of the National Bureau of Standards.

It has been pointed out to us by statisticians that our practice of taking medians is an unconscious acknowledgement of our lack of faith in the validity of the data. With this statement we cannot disagree.

The refinements in test procedure had different effects on the test error; some were definitely of value and some had little, if any, effect. In general, the program was successful in reducing the test error when the RRC recipe was used. The program was only half completed, however, when a different test recipe, which put our test errors on a different level, was adopted by all the synthetic rubber producing plants.

The RRC recipe, which contained a softener, B.R.T. No. 7, American Process zinc oxide, and Captax as accelerator, was quite reproducible within one lot of standard pigments. Great difficulty was encountered, however, in maintaining reproducibility of pigments from batch to batch. This was a serious shortcoming, since a change in lot of one of the pigments would shift the level of test results, and not all compounding ingredients are used up and replaced at the same time. The National Bureau of Standards recommended a recipe using French Process zinc oxide, Altax, and no softener, and it was adopted as the standard test recipe. The test results with the NBS recipe were more reproducible from batch to batch of pigments, but apparently less reproducible within batches.

The test results with the new recipe (NBS) had approximately these standard deviations:

Tensile Strength	150	p.s.i.
Elongation	25	percentage points
Modulus 25′ cure	55	p.s.i.
50′ cure	55	p.s.i.
100′ cure	53	p.s.i.

At this point it was decided that a careful statistical evaluation of the test was required before any further progress could be made. Dr. D. B. DeLury, of the Department of Mathematical Statistics of the Ontario Research Foundation, agreed to study the problem and, with the help of Polymer's technical staff, to set up a test that would isolate and evaluate the factors contributing to the over-all test error.

Statistical Design

It was assumed, as a basis for designing the sampling plan, that variation from four main sources should be isolated and estimated. These were:

1. Product variation, which separates into variation within lots and variation between lots. One lot of rubber is the production from one drier line from 8 a.m. until 8 a.m. next day. For Polysar S it is usually 90,000 pounds.

2. Variation which is introduced in the mixing of compounding ingredients with the raw product.

3. Variation in the curing process. This appears in two components, as "between presses" and "between days".

4. Variation entering the test after the curing process, consisting mainly of the preparation of the test specimens and the mechanical determination of the results of the test.

Two types of sampling plan were adopted to isolate these factors, as follows:

PLAN I

Twelve samples, each weighing several pounds, were chosen randomly from one lot of rubber and divided into three groups of four, each group to be tested on a different day. Each sample was separately mixed and divided into two portions, one of which was cured in one press, the other in another. Three dumb-bell specimens were tested from each sheet.

TABLE I—SUMMARY OF ANALYSES OF VARIANCE

		25′ Modulus I	25′ Modulus II	25′ Modulus Wtd. Ave.	50′ Modulus I	50′ Modulus II	50′ Modulus Wtd. Ave.	100′ Modulus I	100′ Modulus II	100′ Modulus Wtd. Ave.	50′ Tensile I	50′ Tensile II	50′ Tensile Wtd. Ave.	50′ Elongation I	50′ Elongation II	50′ Elongation Wtd. Ave.
Polysar S	V(E)	558	426	505	1236	823	1071	1205	1012	1128	46840	41803	44825	959	640	831
	V(M+S)+V(M+S P)	1525	—	—	1324	—	—	981	—	—	2425	—	—	44	—	—
	V(M)+V(MP)	—	670	—	—	510	—	—	1008	—	—	4862	—	—	152	—
	V(S)	—	92	—	—	317	—	—	69	—	—	2443	—	—	30	—
	V(P)	379	96	190	222	401	341	64	0	21	295	0	98	39	28	32
	V(D)+V(PD)	316	—	—	0	—	—	271	—	—	8380	—	—	108	—	—
	V(L)	3035	—	—	4853	—	—	6208	—	—	10023	—	—	81	—	—
Polysar S-AC	V(E)	446	410	432	598	534	572	1239	804	1065	30352	25091	28247	747	689	729
	V(M+S)+V(M+S P)	399	—	—	2424	—	—	1064	—	—	3932	—	—	184	—	—
	V(M)+V(MP)	—	1682	—	—	1503	—	—	2493	—	—	15115	—	—	184	—
	V(S)	—	56	—	—	412	—	—	196	—	—	4553	—	—	43	—
	V(P)	46	243	177	296	220	245	0	108	72	36	766	523	0	66	44
	V(D)+V(PD)	559	—	—	679	—	—	1877	—	—	2318	—	—	36	—	—
	V(L)	411	—	—	1838	—	—	2242	—	—	48233	—	—	392	—	—
Polysar S-20	V(E)	452	—	—	1118	—	—	1584	—	—	42349	—	—	764	—	—
	V(M+S)+V(M+S P)	1793	—	—	3309	—	—	2295	—	—	8238	—	—	132	—	—
	V(P)	23	—	—	79	—	—	39	—	—	522	—	—	5	—	—
	V(D)+V(PD)	136	—	—	106	—	—	415	—	—	5059	—	—	22	—	—
	V(L)	549	—	—	167	—	—	16	—	—	2024	—	—	167	—	—
Polysar Krylene	V(E)	314	—	—	583	—	—	1051	—	—	121759	—	—	841	—	—
	V(M+S)+V(M+S P)	2198	—	—	4004	—	—	3464	—	—	26078	—	—	288	—	—
	V(P)	123	—	—	0	—	—	30	—	—	0	—	—	26	—	—
	V(D)+V(PD)	502	—	—	1036	—	—	426	—	—	1935	—	—	255	—	—
	V(L)	967	—	—	0	—	—	300	—	—	45195	—	—	82	—	—

Three repetitions on three different lots completed the sampling under this plan.

This type of sampling was carried out on each of four products: standard general-purpose synthetic rubber (Polysar S), lower Mooney rubber (Polysar S-20), alum-coagulated rubber (Polysar S-AC), and cold rubber (Polysar Krylene). This was to determine whether test error was independent of the type of rubber under test.

Since mixing errors and within-lot product variation were not separated under Plan I, a second sample plan was introduced to resolve these two components.

PLAN II

Six large samples were chosen from one production lot, and each divided into four subsamples which were separately compounded. Portions of each subsample were assigned to the two presses for curing, the whole of one curing being assigned to the four subsamples from one original sample. One sample was cured each day for six consecutive days. Under this plan, variations between samples within lots was combined with variations "between days", and may therefore have given somewhat inflated values for within-lot variation. The mixing error, however, was estimated within samples and within presses and should not have been affected by these sources of variation.

Sampling of this type was carried out on Polysar S and Polysar S-AC. The results of these tests indicated consistently that mixing error was considerably greater than within-lot product variation.

The data obtained from these two plans were submitted to analyses of variance, which permit the separation of the components of the total test variation. The result of the analyses is summarized in Table I.

The average values of the variances are written in terms of the following notation:

- V ( ) stands for variance.
- E represents the portion of the testing error entering through the cutting of the test specimens and the determination of the test results on the Scott Tester.
- M represents mixing error.
- S represents the within-lot product variation.
- P represents the difference between presses. This is considered not a fixed difference but a chance difference, much the same as the difference between two consecutive runs of the same press.
- D represents differences between days.
- L represents lot-to-lot product variation.

Symbolic products, such as PD, stand for interaction.

The components in Table I may be used, *under the supposition that all the sources of variation are controlled,* to calculate the resultant error of any test procedure. Thus the total testing variance is obtained by taking one third of the component V(E), the cutting and pulling variance, together with the sum of all the other components of testing variance. These are the mixing variance [V(M) +V(MP)], and the curing variance between presses, [V(P)], and between days [V(D)+V(PD)]. This is shown in Table IV. The use of one third of the component V(E) refers to the means of sets of triplicate determinations on the Scott Tester. Presumably the error of the medians of the triplicate sets would be only trivially different. It is to be emphasized, however, that these components and any calculations based on them may be misleading if any of the sources of variation are not in control.

TABLE II—VARIANCE OF DIEING AND PULLING

	25′ Mod.	50′ Mod.	100′ Mod.	Tensile	Elong.
Polysar S (GR-S)	505	1071	1128	44825	831
Polysar S-AC (GR-S-AC)	432	572	1065	28247	729
Polysar S-20 (GR-S-20)	452	1118	1584	42349	764
Polysar Krylene (Cold rubber).	314	583	1051	121759	841

Results

Several features of these results should be noted, as follows:

1. The mechanical portion of the test procedure, which is the steps of dieing out and pulling on the machine, is under good statistical control. That is, the results fall in a reasonably steady pattern (Table II). This component, V(E), displays excellent stability throughout the test, and is estimated with high precision, since it is calculated from many sets of triplicate determinations. Expressed in the dimensions of standard deviation, the contribution of this component to test error is approximately:

25′ Modulus	12 p.s.i.
50′ Modulus	17 p.s.i.
100′ Modulus	20 p.s.i.
Tensile	135 p.s.i.
Elongation	16 percentage points

when medians of three strips are taken.

2. The mechanical portion V(E) of the test procedure contributes only a minor part of the total testing error of the three moduli, whereas this component dominates all other sources of error in the tensile and elongation tests (Table III).

3. The effects of the mixing error V(M) on the three moduli are large and erratic (Table IV). While the estimates of mixing error themselves are subject to considerable error, it seems reasonable to infer that the mixing process is largely uncontrolled.

4. Within-lot product variation V(S) is, in general, so small as to be unimportant when compared with the other sources of variation.

5. Errors introduced in the curing process (Table V), while substantial, seem to be of secondary importance in the modulus determinations and somewhat more important in the tensile and elongation measurements (Table III).

6. The estimates of lot-to-lot variation are so erratic that no conclusions can be based on them. They are, of course, poor estimates, since they are determined from only three lots. In any event, in a large portion of the tests the estimate of lot-to-lot variation is quite outweighed by testing errors.

The standard deviations determined by this work are approximately as follows:

TABLE III—TEST ERROR COMPONENTS
(Expressed as Standard Deviations)

	25′ Mod.	50′ Mod.	100′ Mod.	Tensile	Elong.
Dieing and Pulling	12.0	16.6	19.8	134.0	16.2
Mixing	37.5	48.2	43.6	100.5	12.8
Curing	16.3	18.5	19.9	48.6	8.3
Total test std. deviation..	42.6	54.2	51.9	174	22.3

TABLE IV—VARIANCE OF MIXING

	25′ Mod.	50′ Mod.	100′ Mod.	Tensile	Elong.
Polysar S (GR-S)	1525	1324	981	2425	44
	670	510	1008	4862	152
Polysar S-AC (GR-S-AC)....	399	2424	1064	3932	184
	1682	1503	2493	15115	184
Polysar S-20 (GR-S-20)	1793	3309	2295	8238	132
Polysar Krylene (cold rubber).	2198	4004	3464	26078	288

25′ Modulus	43 p.s.i.
50′ Modulus	54 p.s.i.
100′ Modulus	52 p.s.i.
Tensile Strength	175 p.s.i.
Elongation at break	22 percentage points

These figures may appear inordinately high when compared to other published results for test deviations, particularly of modulus, some of which have been as low as 10 or 15 p.s.i. Table III would indicate that if strips were taken from one heat of one mix, the deviations should be of this order: 12, 17, and 20 p.s.i. These results, however, would give no indication whatever of the level of test results to be expected on a second heat or on a second batch of the same compound, since curing and mixing components of variation would then enter into the determination.

Table III indicates that improvement of testing machines can accomplish no important reduction in the test error of modulus determinations. Complete elimination of the component of test error entering through dieing of the dumb-bell and pulling on the Scott Tester would reduce the deviation of the 25-minute modulus from 42.6 only to 40.9, the 50-minute modulus from 54.2 only to 51.5, and the 90-minute modulus from 51.9 only to 47.9.

Each of the sources of testing error isolated by the sampling plans proved to be important. Mixing error appeared to have the largest effect on the moduli, with curing errors running somewhat smaller; while for the tensile and elongation determinations, neither source of error consistently surpassed the other for all types of rubber tested. The third source of error, that entering through the cutting and testing of test specimens, contributed substantially to the testing error, especially of the tensile and elongation tests. However, its effects were diminished by the practice of using the mean or median of triplicate determinations and could be further diminished by the practice of increasing the number of specimens tested, since this source of error gave evidence of being in control. The mixing and curing errors, on the other hand, gave no such evidence and the effect of introducing additional mixes or cures into the test procedure cannot be predicted with confidence.

Dr. DeLury concluded that: "In view of these findings, it appears that stress-strain measurements, as they are at present carried out, do not provide a dependable basis for assessing an individual lot, either for use in a

TABLE V—VARIANCE OF CURING

	25′ Mod.	50′ Mod.	100′ Mod.	Tensile	Elong.
Polysar S (GR-S)	506	341	292	8478	140
Polysar S-AC (GR-S-AC)....	736	924	1949	2841	80
Polysar S-20 (GR-S-20)	159	185	454	5581	27
Polysar Krylene (cold rubber).	625	1036	456	1935	281

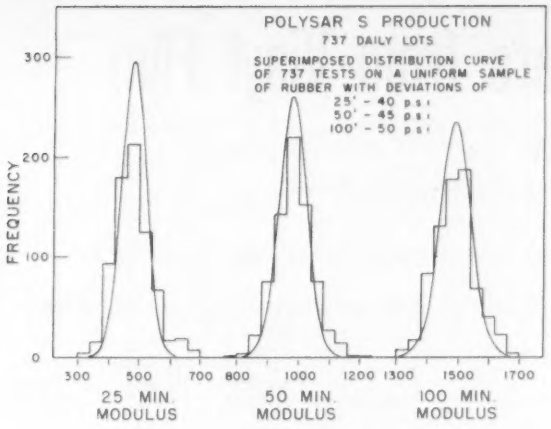

Figure 1.

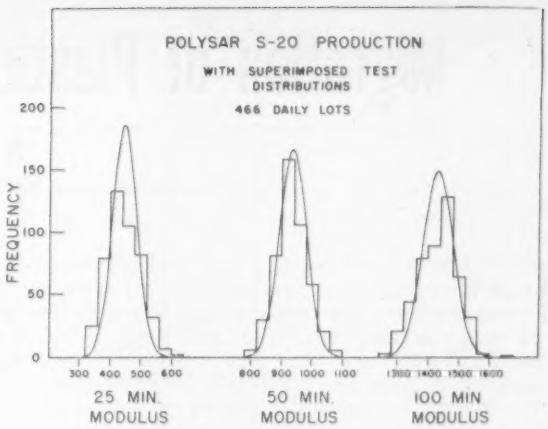

Figure 2.

quality control program or for any other purpose where action is to be taken on the strength of a determination of quality of a single batch of product."

The practical aspects of this conclusion and of the magnitude of the test errors are probably somewhat different for a rubber consuming company and for a rubber producer such as Polymer Corporation. In the consumer's plant compounds must frequently be produced with a minimum tensile specification, but seldom with a narrow minimum and maximum modulus specification. In this case, repeated testing of sample strips from one mix would be of value in giving a more precise result. The minimum tensile specification is of minor importance to Polymer Corporation, however, since in approximately nine years of operation no lot of standard rubber has been off-specification for tensile strength.

For modulus, however, the picture is different. If we adopt the limits usually employed in quality control, plus and minus three standard deviations, and assume that all the errors are in control, stress-strain determinations could wander over a range that covers approximately 80% of the usual specification range for the 25-minute modulus, 75% for the 50-minute modulus, and 73% for the 100-minute modulus, without implying that anything but test error is responsible. In view of the fact that some of the components of test error are not well controlled, it appears that still wider fluctuations may be expected, even when the product is absolutely uniform.

Figure 1 illustrates this point. It is for 2 years and 9 months of consistently produced and tested Polysar S (GR-S), that is, from the adoption of the NBS test recipe to the commencement of production at a different bound styrene level. There are 737 consecutive daily lots of rubber represented here. Superimposed on these production results are the smooth curves of the spread of results that would be found by doing the same number of tests on a uniform sample of rubber. These results are substantially repeated in Figure 2 for Polysar S-20 (GR-S-20) (2 years and 9 months—466 lots) and in Figure 3 for Polysar Krylene (90 lots).

It would appear from these figures that the production control specifications, such as for butadiene-styrene ratio, percent conversion, Mooney, moisture content, free soap, etc., exhibit such sufficiently good control of the physical properties of the rubbers that an additional grading test, which introduces a very large test error, is inadvisable.

That the stress-strain result can be misleading is evident from an examination of the present test errors.

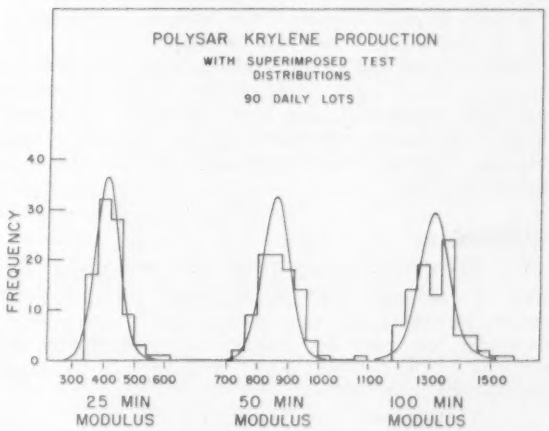

Figure 3.

A standard deviation of 56 p.s.i. for the 50-minute modulus means that on the average of once in every twenty lots a result will be reported that is 112 p.s.i. greater or smaller than the true value. This is equivalent to a 8½-minute error in estimation of cure time at the optimum. Since this is 12% of the optimum tensile cure time such results might well lead the compounder to make an acceleration adjustment. Once in every fifty lots, that is, with 2% of production, a result will be reported that is 130 p.s.i. greater or smaller than the true value. It is obvious that acceptance of the test data without careful consideration of the test errors can be dangerous.

For research, where modulus figures must be determined as a measure of rate of cure, we can only suggest that it is necessary to do repetitive mixing and curing of the rubber to reduce the test error and narrow the confidence limits. Here, however, until it can be demonstrated that the mixing and curing steps are in statistical control, no prediction can be made as to the reduction in test error to be expected.

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Migration of Plasticizers from Vinyl Film

By B. COE

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THE ability to evaluate, in a reproducible manner, the relative merits of various plasticizers is important to manufacturer and consumer alike. For while laboratory tests can rarely predict the actual service life of a plasticized compound, they can establish a hierarchy among plasticizers which generally indicates their relative service lives. For this reason we are always anxious to test or employ any new method which appears to offer a precise measure of a specific property or group of properties relating to plasticizers.

Recently, therefore, our plasticizer applications research laboratories entered into an intensive investigation of a newly introduced method for determining the migration of plasticizers from vinyl compounds. This is the method outlined by C. M. Grafton and J. R. Geenty in a paper on "A Study of Plasticizer Migration" before the Third Annual Plastics Film, Sheeting and Coated Fabric Conference, sponsored by the Society of the Plastics Industry, which was held in New York in December, 1951.

Test Method

The test is a relatively simple one. Plasticized vinyl stock is contacted with an absorbent powder under various pressures and temperatures and the amount of plasticizer lost into the powder by migration is determined by "before and after" weighings of the stock. The method is as follows:

Twenty-five cubic centimeters of Linde silica (Linde Air Products Co.) or Silicic Acid, A.R. —100 mesh (Mallinckrodt Chemical Works) is placed in a square tin can measuring 2⅜ x 2⅜ x 2½ inches. A sample of the stock to be tested is centered on this and another 25 cc. of powder placed atop the sample. An aluminum barrier, 2¼ x 2¼ inches x 0.020-inch, is inserted, and the arrangement repeated as often as desired or until the can is full. Oak filler blocks, 2¼ x 2¼ inches, are then placed on the completed "sandwich", and various pressures applied to the contents of the can by setting weights on these blocks. The entire assembly is then placed in a circulating air oven. The powder is changed and the samples weighed three times: after the first, third and eighth days. Percent plasticizer loss is calculated as change in weight based on total initial specimen weight.

Duplicate specimens, 2 x 2 inches x 0.010-inch ± 0.001-inch, were used throughout our study, and were taken from standard vinyl stocks of the following composition:

	Parts
Geon 101 (Goodrich Chemical)	60.0
Plasticizer	40.0
Tribase (National Lead Co.)	1.0
Stearic Acid	0.5
Total	101.5

In each case, prior to weighing, the samples were wiped clean and conditioned for at least 15 hours in a room maintained at 25° C. and 50% relative humidity. Three plasticizers were first tested with different absorbents and at varying temperatures and pressures. On the basis of these tests, a standard set of conditions was established, under which seven plasticizers were compared. These were: Paraplex G-25, G-40, G-50, G-60, Monoplex S-38, tricresyl phosphate and dioctyl phthalate. It should be noted that the plasticizers which were tested were those recommended for use under conditions where migration must be minimized. Plasticizers designed primarily for low temperature service were not included, since they are known to be highly migratory.

TABLE I—PERCENT PLASTICIZER LOSS VS. ABSORBENT
(At 60° C. and 5 psi pressure)

		Plasticizer		
Absorbent	Day	Paraplex G-50	Paraplex G-60	Dioctyl Phthalate
Linde Silica	1	7.7	10.7	13.4
	3	12.2	17.7	21.4
	8	15.9	21.9	24.6
Mallinckrodt Silicic Acid	1	5.8	10.5	14.9
	3	10.5	17.2	19.9
	8	16.4	22.3	23.8

Note: Each value is an average of two determinations.

TABLE II—PERCENT PLASTICIZER LOSS VS. PRESSURE AT 60° C.

		Plasticizer		
Pressure	Days	Paraplex G-50	Paraplex G-60	Dioctyl Phthalate
1 psi	1	3.5	5.4	6.1
	3	8.3	12.6	13.5
	8	12.8	18.1	21.7
5 psi	1	7.7	10.7	13.4
	3	12.2	17.7	21.4
	8	15.9	21.9	24.6
10 psi	1	8.2	12.9	15.7
	3	12.2	18.9	21.1
	8	15.8	22.5	24.3

Note: Each value is an average of two determinations.

Effect of Absorbent

Two siliceous materials—Linde Silica and Mallinckrodt Silicic Acid, A. R.-100 mesh—were recommended in the original paper describing the silica gel migration test. Comparison of data obtained at our laboratories employing these products indicated that there exist no significant differences between their effectiveness. Any variations which did occur in the data were so slight as to suggest that they could be attributable to normally anticipated experimental errors. Table I, for example, illustrates the essential equivalence of the absorbents.

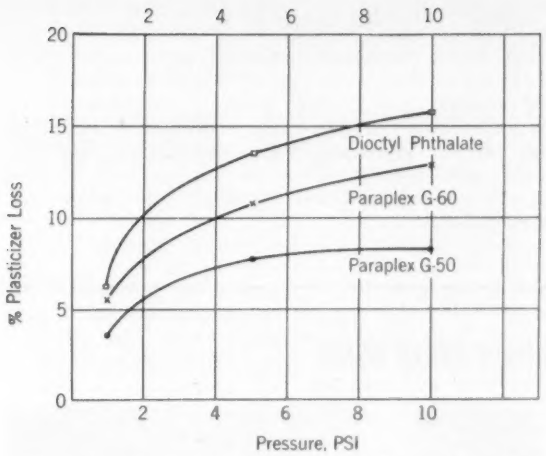


FIG. 1—Pressure versus migration loss. (One day at 60° C.).

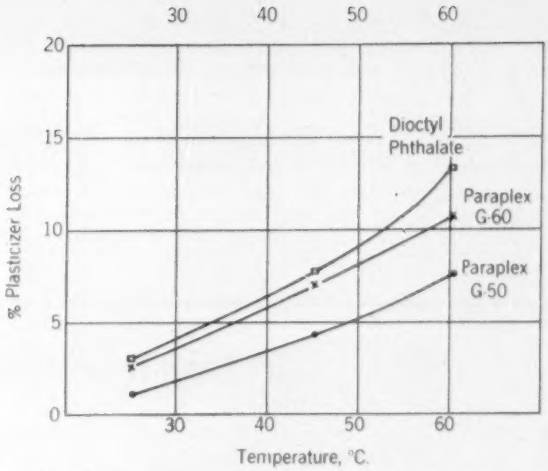


FIG. 2—Temperature versus migration loss. (One day at 5 psi pressure).

Effect of Pressure

To determine the effect of pressure on plasticizer loss by migration, tests were carried out in which pressures of one, five and ten pounds per square inch were applied to the absorbent-covered samples. Temperature was maintained constant at 60° C. The results (Table II) show that loss of plasticizer is indeed a function of pressure; the greater the pressure and the time during which it is applied, the greater the migratory loss.

As expected, the polymeric plasticizers, Paraplex G-50 and Paraplex G-60, displayed less tendency to migrate than the monomeric plasticizer. Because reasonably large values were obtained at five pounds pressure per square inch, utilizing a 20-pound weight, this pressure was adopted as a standard for future work.

It is interesting to note, as evidenced by Figure 1, that the greatest increment of loss occurs when the pressure is increased from one to five pounds per square inch.

Effect of Temperature

As would be expected, plasticizer loss increased as the temperature was raised. A very rough approximation of the time required to attain equivalent plasticizer losses at different temperatures may be obtained from the data in Table III: one day at 60° C., or 2¼ days at 45° C., or 11 days at 25° C.

Since it is possible that at temperatures exceeding 25° C. loss of plasticizer through volatilization may occur, and since the values obtained at 25° C. are readily reproducible without the use of an oven, this temperature has been suggested as standard.

As when pressure was varied, the polymeric plasticizers exhibited less tendency to migrate than the monomeric plasticizer (Figure 2).

TABLE III—PERCENT PLASTICIZER LOSS VS. TEMPERATURE AT 5 PSI PRESSURE

Temperature	Days	Plasticizer: Paraplex G-50	Paraplex G-60	Dioctyl Phthalate
25° C	1	1.2	2.7	3.1
	3	2.5	5.6	7.0
	8	4.0	8.7	10.7
45° C.	1	4.4	7.2	7.8
	3	8.1	13.4	15.7
	8	12.0	18.5	20.7
60° C.	1	7.7	10.7	13.4
	3	12.2	17.7	21.4
	8	15.9	21.9	24.6

Note: Each value is an average of two determinations.

Effect of Plasticizer

The seven plasticizers listed at the beginning of this article were evaluated for their migratory tendencies under five pounds pressure per square inch at 45° C., using Linde Silica as absorbent. The values employed

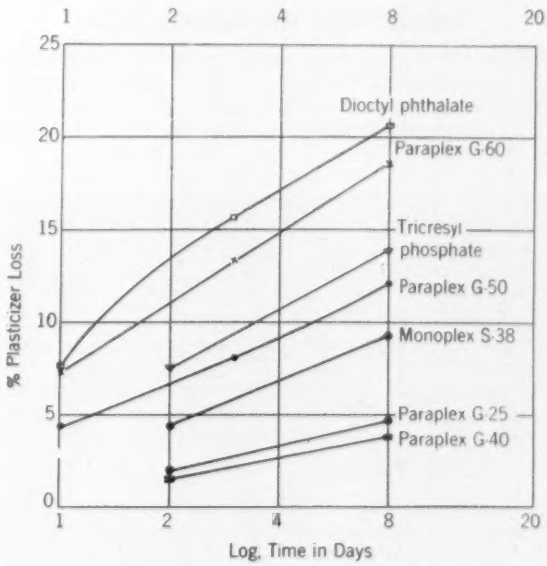


FIG. 3—Plasticizer versus migration loss. (5 psi at 45° C.).

in preparing the curves in Figure 3 are averages of triplicate determinations in most cases. In general, they indicate, as have older tests, that polymeric plasticizers migrate less than do monomeric plasticizers, although exceptions exist. These conclusions, of course, have had their confirmation over the years in the splendid results obtained by use of the Paraplex plasticizers.

It is obvious from the data that plasticizer loss, as determined by the silica gel test, is exceptionally great, particularly when it is considered that it represents loss purely through migration into a solid, inert medium. It seems probable, therefore, that these results are artificially high; consequently, predictions of actual service life based on these tests may be difficult to make.

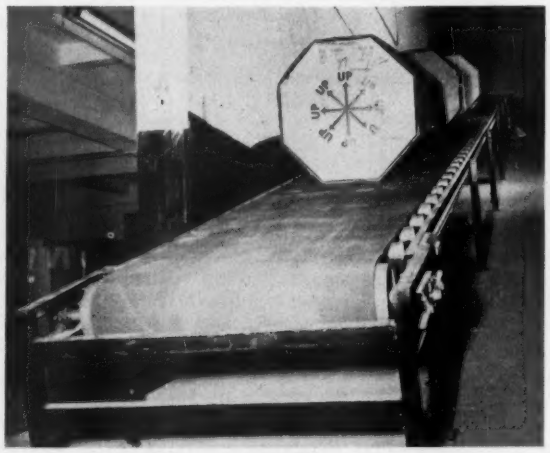
At present, the greatest value of the silica gel test lies in its ability to provide a reproducible measure of one type of plasticizer migration. It may lead to a better understanding of service failures from the wicking effect of dust and cloth in contact with various types of vinyl film.

Rough-Topped Belting Conveys Heavy Boxes

A CONVEYOR belt with a cover composed of rubber gripper points to hold packages securely, even on relatively steep inclines, is simplifying the delivery of heavy cartons at the New York City plant of the Schwab Rubber Co. This firm must move eight-sided cartons containing latex foam rubber rolls and sheets between trucks at the curb and its lower level premises. Gravity chutes could not be used because the cartons weigh up to 200 pounds and because chutes could not handle outgoing shipments moving upwards.

The problem has been successfully met by the Duane Machinery Corp. of Long Island City, N. Y., which designed and installed a reversible conveyor using a Thermoid "Ruff Top" belt whose surface is studded with flexible but tough rubber gripper points which prevent any sliding of the heavy cartons. The 55-foot belt operates on a 17° incline at 50 feet per minute driven by a 2 hp geared motor.

Duane Machinery will soon install a similar unit, using the same type of belt, to convey materials in and out of new second-floor facilities now being readied for occupancy.



The surface of this Thermoid "Ruff Top" belt is studded with flexible but tough rubber gripper points to prevent any sliding of heavy cartons.

Peabody Pocket Size Hardness Tester

A pocket size hardness tester, primarily designed for use with metals, but which has also been used successfully for testing hard rubber, plastic sheet stock, Fiberglas laminates, and other materials, has been developed by Peabody Industries, Inc., 1819 Broadway, New York 23, N. Y. The instrument, which weighs only 7 ounces, is said to have made possible the testing of internal mold and die sections with an area as small as 1 square inch where heretofore the throat and daylight openings of standard test machines limited testing to the periphery of the work. Somewhat like a fountain pen in shape, the instrument is simple to operate. The operator merely extends the spindle to its full height, depresses a trigger, allows it to rebound where it stops and is held automatically, and reads the hardness directly from the calibrated scales on the tester. Two models are available, one for steel and the other for use on nonferrous metal surfaces.

Durachron, a new stopclock for laboratory and industrial applications, has been announced by Andrew Technical Service, 3805 N. Clark St., Chicago 13, Ill. It is claimed to be superior to conventional stopwatches in that it frees both hands during observations.

Merco Infra-Red Drying Equipment

Merco infra-red heating and drying equipment, produced by the the Corona Manufacturing Corporation of Glendale, Calif., is being widely used in a variety of applications, including the seaming of rugs and carpets with latex and tape. Installation costs of the Merco heaters are said to have been reduced far below other types of drying equipment. For example, in an ordinary bulb oven to cover 4 feet of area, 6 bulbs are needed, requiring 6 sockets and 12 connections. With the Merco units, no sockets and only two connections are required. The Merco tube is designed to resist thermal and mechanical shock and gives no hot-spots. Because it contains no gas and operates at atmospheric pressure it cannot explode, thus reducing fire hazards. The tube emits only a faint glow when in operation, which is said to be an important feature in applications involving colors which are light sensitive and tend to fade. Sizes available range up to 24 feet in length.

Development of a **new type bench grinder,** which handles machine knives up to 22 inches in length, has been announced by Samuel C. Roger & Co., Buffalo 11, N. Y. It can be used to handle gumming of circular saws, drills and tools, and is completely automatic.

Adequate Fire Protection System Important Adjunct to Spalding Expansion Program

THE planning and installation of an adequate fire protection system was an important part of the recent expansion program at A. G. Spalding & Bros., Inc. Since the buildings at the main plant in Chicopee, Massachusetts, were not adapted to modern manufacturing methods, decision was taken to enlarge the plant at nearby Willimansett. The expansion was so extensive that it amounted essentially to the erection of an entire new plant.

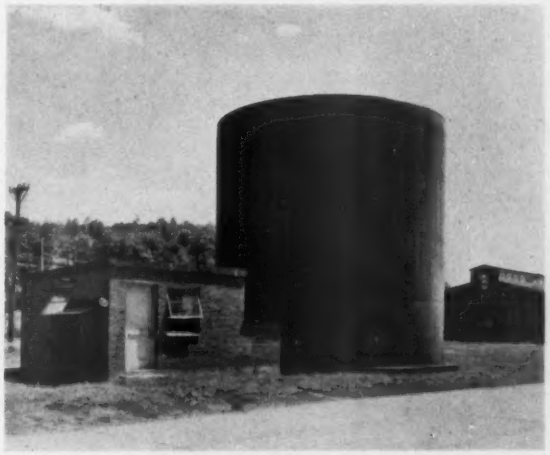
Management from the start recognized the importance of protecting its manufacturing processes from interruption caused by fire. They requested engineers of the Factory Mutual Engineering Division to consult with their architects and engineers, with the result that all essential protection features were incorporated in the original planning and erection of the plant.

The development of adequate water supplies for the fire protection system was vital. Existing water supplies would not be adequate for the new buildings and management realized that improvements were necessary to operate safely.

The amount of water available had already been determined by water flow tests. Based on experience in similar occupancies and buildings, the amount needed for fire protection was calculated. The result was the development of a complete fire main system, using existing yard mains as far as possible. Domestic water connections were removed from this system, so that the fire service mains would be available exclusively for fire protection.

A 1000-gallon-per-minute fire pump with a 150,000-gallon reservoir as suction supply was installed to augment the water from public mains and to serve as standby protection.

A review of processes indicated the need for automatic sprinklers in most areas and more than 2000 were installed in the new buildings. Additional sprinklers were provided in special equipment. Sprinklers designed to open at higher temperatures were installed near hot processes, steam lines and heaters, to eliminate the possibility of water damage from premature operation.



New fire pump hose and suction tank at the Willimansett plant.

Management then went a step further. They contracted with a nationally known service to provide electrical supervision for the fire protection system and watchman service. The electrical signalling system from an outside central station was connected to water-flow alarms on sprinkler systems, indicating devices on sprinkler control valves, water and temperature level indicators in the pump suction tank, and watchmen's stations.

Fire extinguisher needs throughout the plant were surveyed. Various types of extinguishers suited to the hazards of particular areas were purchased, and small hose units with connections to the sprinkler systems were installed.

Processes having more than ordinary fire hazard were closely watched during the first few weeks of production. The storage of flammable liquids, frequently a plant problem, had to be solved. The considerable amounts of

Over-all view of the greatly expanded Spalding plant at Willimansett, Massachusetts.

flammable lacquers and solvents could not be stored in the existing location. A new one-story fire-resistant building was erected, with drum storage well arranged on electrically-grounded racks. Automatic sprinklers were installed with closer spacing because of the extra hazard. An ample exhaust system insures against the formation of flammable vapor clouds due to drum leakage.

A program of electrical improvements was developed in connection with the new areas, resulting in a modernized plant-wide distribution system. All electrical equipment, including the extra hazard areas, conform to requirements of the National Electric Code.

Many improvements were made to safeguard the balata refinery and solvent recovery plant. These included the installation of additional sprinklers under equipment which shields ceiling sprinklers, additional floor drains to confine accidental spillage of flammable liquids to a single room, and other changes in process equipment to avoid the possibility of discharge of explosive vapor into room areas.

The organization of a drilled plant fire brigade is being planned. Because of the specialized nature of processes, fire squads of men familiar with the hazards will be of particular value.

The intelligent approach of Spalding management to the problems of fire protection during this extensive plant expansion has resulted in a plant that provides maximum fire safety for employees, protection of the stockholders' investment, and continued operation of the Spalding team.

Report of Recent Accidents in Rubber Factories

A RECENT analysis of the minor injuries occurring at a large rubber plant showed the following parts of the body to be involved: Hands, 47.24%; Eyes, 11.52%; Arms, 11.35%; Legs, 9.7%. Thus, nearly 80% of the plant's injuries center around these parts of the body. Although the percentages will vary, it is reasonable to assume that this general pattern occurs in most rubber plants. A number of accidents involving hands, which leads percentagewise, as recently reported in the *Safety News Letter* issued by the Rubber Section of the National Safety Council, follow herewith:

1. A mill man attempted to remove or pick off a small piece of stock close to the bite of the rolls with a 10-inch strip feed knife. The knife caught in the bite, drawing his right hand between the rolls. Though he immediately pulled his hand back freeing himself from the machine, he suffered the loss of the right thumb and index finger.

2. A loom operator leaned over a circular loom in a hose jacket department and placed his right hand on the top frame. The machine was being broken in at the time and running empty at one-third speed. A circular metal piece which acts as a guard was not in position, thus allowing the employee's right hand to extend inside the machine and close to the moving parts. The operator's finger was crushed between the metal shuttle and the roller bearing.

3. A laboratory technician sustained a deep cut inside of the little finger of the right hand with severance of the tendon as the result of placing glass tubing in a rubber stopper.

4. A mill room employee, unable to move a loaded skid with a hand truck, used an electric truck although not authorized to do so. In backing up, the truck ran into a large bull gear, crushing his right hand between the truck and the gear.

Neoprene-Jacketed Wire for Wet Locations

THE wet end of a paper mill is one of the world's roughest services for electric wiring. The accompanying photograph shows only one abuse, namely daily drenching when the whole area is washed down. The air itself is hot and steamy, floors are wet, and in many locations wiring is subjected also to an occasional dose of chlorine, caustic soda or other chemical used to digest or bleach the pulp.

In many paper mills it is becoming standard practice to use neoprene-jacketed wiring for such service. One of these is the plant of the Ecusta Paper Corporation in North Carolina, a leading producer of fine cigarette paper. The picture was taken in Ecusta's bleach building and shows an expansion joint in the conduit under a conveyor. Note that the conduit and the exposed neoprene-jacketed wire are hosed down along with everything else. This daily wash-down is standard procedure throughout the wet end of the mill. "We install all our wire and cable in conduit," says the electrical maintenance supervisor at Ecusta, "but it is just plain impossible under conditions like this to keep moisture from getting inside."

Electric wiring is regularly subjected to drenchings of this kind in the Ecusta Paper plant.

When the Ecusta plant was built in 1939, it was wired in the wet areas with Type RW (water resistant) building wire, jacketed with saturated braid. But the triple threat of moisture, heat and chemicals was too much—failures began to occur after five or six years because of braid deterioration and breakdown of the underlying insulation. The company switched to neoprene-jacketed wire and now uses it exclusively in all its wet locations—both for new wiring and for replacement of the old braid-jacketed wire when it fails. Many thousands of feet of it have been installed in the last six years, most of it in power and control circuits (600 volt a.c.) in the plant's pulp mill, bleach building, paper machine area, and electrolytic cell room (where chlorine for bleaching is produced from salt). It is also used for all 5,000 volt a.c. feeder circuits throughout the plant, and for most outdoor wiring, both overhead and underground.

"Failures on this wiring," the electrical maintenance supervisor says, "have been practically non-existent, and those that have occurred have not been caused by jacket deterioration."

Editorials . . . . . .

Expansion Program

THE Revenue Act of 1950 provided for an accelerated tax amortization program. Prior to passage of this act, the period permitted for depreciation of new facilities for tax purposes varied up to 25 years, depending upon the normal life usefulness of the facility involved. Under the new statute, this period may be shortened to five years for such portion of the new investment as the Defense Production Administration may determine. The main purpose of the amortization program is to expand private industry's productive capacity to meet mobilization goals and to keep government ownership of defense facilities to a minimum.

That the rubber manufacturing industry is well aware of this special program and is fulfilling its role in the expansion of defense facilities is evident in the list of certificates of necessity, which provide for rapid tax write-off, which we have been publishing in almost every issue. What is not generally realized, however, is the extent of the over-all program and the rapid progress which is being made in meeting it. A few figures should prove of interest.

Over 11,000 companies submitted data to DPA prior to September 30, 1952, and have received certificates of necessity. The total contemplated expansions covered by these certificates amount to approximately $21.2 billion dollars. By September 30, 1952, approximately $12.1 billion of facilities, or 57% of the program, was in place. By the end of last June, projects numbering 5,693 and valued at $3.4 billion dollars were reported completed. For the records, the largest single expansion program covers electric light and power, with a contemplated cost of $3,077,799,000, with the iron and steel industry in second place with a contemplated cost of $3,007,621,000, the latter figure covering blast furnaces, steel works and rolling mills.

The extent of the rubber industry's position in the facilities expansion program can be realized by the number of certificates of necessity approved through September 5, 1952. For example, manufacturers of tires and tubes have received approval for 56 projects covering a total proposed investment of $89,867,000; producers of general rubber goods, 133 projects, with a proposed investment of $118,439,000; synthetic rubber manufacturers, 10 projects, with a proposed investment of $21,510,000; manufacturers of reclaimed rubber, 15 projects, with a proposed investment of $9,835,000, and manufacturers of rubber goods (not elsewhere classified), 61 projects, with a proposed investment of $18,677,000. It should be emphasized that only a portion of the proposed investment falls under allowable tax amortization, and this percentage varies in almost every case. However, for the rubber industry in general it is approximately 50% of proposed investment.

There can be no doubt that the rubber manufacturing industry is in for an extended period of expansion. These figures also help to explain how and why total sales in the field now exceed $5 billion dollars per annum.

Inspection Instruction

BY this time the entire rubber manufacturing fraternity is aware of the excellent job being done by the Crude Rubber Committee of the Rubber Manufacturers Association relative to the inspection and grading of crude natural rubber. The exhibits and seminars prepared by the Association have already been presented in several leading rubber manufacturing centers and literally hundreds of chemists and technologists have had their eyes opened to the dollar savings possible through proper inspection and end-product quality improvements which can be achieved through proper grading. The RMA is already planning further steps which can be taken by the industry to better its competitive position.

One of these steps lies in the possible creation of a dockside inspection training school. Definite evidence for the need of such a school is emanating from the seminars being held. If such a school were created, rubber manufacturers could assign personnel for basic instruction in the art of natural rubber inspection. Definite plans for an inspection school have not yet been drawn up, but if the industry indicates sufficient interest, the RMA Crude Rubber Committee will explore the methods and cost of instituting such a service. The program might require that trainees spend at least two weeks on New York docks.

Here is an unprecedented opportunity for small and medium-sized rubber manufacturing concerns to enable key personnel to properly grasp the fundamentals of rubber inspection. The cost of training such personnel would be a pittance compared with the long-term results and dollar savings which would inevitably result from such a course. The actual training program would be in the hands of dockside inspectors who have spent a lifetime in the handling, testing, inspecting and grading of natural rubber. We urge every rubber manufacturer, large and small, to take advantage of this opportunity and to urge the RMA Crude Rubber Committee to organize and operate the training school as soon as possible.

NEWS OF THE MONTH

NPA EASES CURBS ON NATURAL CREPE USE AS RFC LAUNCHES APPRAISAL OF SYNTHETIC

EASING of restrictions on the use of natural crepe rubber and reinstatement of a provision requiring the marking of Butyl tubes has been announced by the Rubber Division of the National Production Authority. Meanwhile, the Reconstruction Finance Corporation has engaged a Los Angeles firm to make an engineering appraisal of the present value of the government's synthetic rubber facilities. The NPA action easing restrictions on consumption of natural crepe was taken in an amendment to Order M-2, dated October 28, 1952. The new amendment deletes the prohibition on the use of sole crepe in the manufacture of shoes and permits the use of pale crepe in such manufacture other than grades IX and 1, thick or thin. It also reinstated a special provision for marking Butyl tire tubes which previously appeared in Appendix A of Order M-2, as amended on March 26, 1952. Order M-2 as amended on April 21, 1952, removed the manufacturing specifications which previously had specified Butyl tube markings.

Walter A. Krappe, acting director of the NPA Rubber Division, explained that the easing of restrictions on the use of sole crepe rubber arises from the fact that the stockpile position of all grades of pale crepe other than IX or 1, thick or thin, has improved substantially.

He said the requirement to mark Butyl tubes is needed in the interests of raw material conservation. Unless scrap rubber is segregated as between Butyl scrap and other than Butyl scrap, the resultant reclaimed rubber will resist vulcanization and be useless for all purposes. Without special marking, only highly skilled technicians are able to differentiate between Butyl scrap and natural rubber scrap, he said.

RFC Appraisal Plan

As for synthetic rubber, RFC announced that the Ralph M. Parsons Co. of Los Angeles, Calif., has submitted a low bid of $114,000 for an engineering appraisal of the present value of the synthetic rubber facilities owned by the government. The appraisal will be part of the development of a plan for the disposal of the twenty-three plants involved.

Industry representatives who have been conferring with RFC officials on the disposal program have recommended the appraisal. The facilities to be appraised consist primarily of a number of copolymerization plants, butadiene production facilities, a styrene plant, and several related facilities. The plan for the disposal of the synthetic rubber facilities is due to be submitted to the President by March 1, 1953, according to the present law.

RFC, in the person of E. Dorrance Kelly, director of its Rubber Division, also announced that no change in the price of GR-S is likely in the foreseeable future. Mr. Kelly said rumors of a reduction from the current 23c a pound government selling price have no basis and that RFC has no intention of making a price change.

Meanwhile, RFC has ordered the partial reopening of the Kobuta, Penna., alcohol-butadiene plant, reversing for a time at least a recent order putting the plant into "mothballs". Agency officials said the reason is that expanding demand for synthetic rubber finds RFC short of the cheaper petroleum-based butadiene. Petroleum-butadiene is in temporary short supply because of a scarcity of butylenes, which are needed also for high-octane military aviation gasoline.

RFC officials confirmed that they have withdrawn government-produced petroleum-butadiene from the commercial market. It went on the market in September at 18c a gallon, when the agency was producing more than the rubber program needed. It was then that RFC ordered the shut-down of its two alcohol-butadiene facilities. Alcohol-butadiene costs about 39c a pound to produce, according to present estimates.

At the same time, agency officials inferentially denied that the alcohol-butadiene plant is being reopened solely to work off excess government supplies of high-cost alcohol. RFC, when it ordered the closing of its alcohol-butadiene plants last month, was left holding 24 million gallons of alcohol, which it bought on the market when prices were high.

Negotiations to sell its excess alcohol to Army Ordnance fell through recently when Ordnance officials refused to pay more than the current market price. RFC would have lost several million dollars if it let the alcohol go to Ordnance on these terms.

The agency said, however, that Ordnance will be able to acquire its full needs on the open market and that a shortage of butadiene for the rubber program is the basic reason for reopening the alcohol-based butadiene plant.

RFC plans to produce about 4,400 tons a month of alcohol-butadiene at the Kobuta facility, which will be operated for it by the Koppers Co. It has enough alcohol on hand to run at this rate about six months. Agency officials emphasized that they have no plans to buy any more alcohol.

From abroad came news that a committee has been set up by representatives of the German rubber industry to boost sales of synthetic rubber. Representatives from two German buna producers — Chemische Werke Huels and Bayerwerken Leverkusen—and other interested parties are involved.

West Germany's production of synthetic rubber is currently running at a low level. Buna output at the Huels works has been curtailed drastically and it is feared that a further drop in sales might result in a temporary suspension of activities. The Huels works recently put a new type of buna, "S3", on the market. The aim of the committee will be to promote the production of this and other new buna types with a view to regaining West Germany's position in the world synthetic rubber market.

World Production Estimated

World production of natural rubber was 142,500 long tons in August, 1952, according to estimates of the Secretariat of the International Rubber Study Group, the NPA Rubber Division announced recently. Total output in the first eight months of 1952 was 1,157,500 tons, nine percent under the 1,275,000 tons produced in the same period a year ago.

Exports of rubber from Indonesia, according to preliminary figures, amounted to 55,553 tons in August, and the cumulative eight month total was 483,180 tons. In the same period of 1951, Indonesian exports were 550,567 tons.

World consumption in August, 1952, was placed at 112,500 tons, bringing the January-August total to 955,000 tons, as against the January-August, 1951, total of 1,022,500 tons. Estimated imports into Russia and China, included in these figures, amounted to 17,250 tons in August, 1952, 103,750 tons in January-August, 1952, and 102,750 tons in January-August, 1951.

Stocks of natural rubber at the end of August, 1952, were estimated at 760,000 tons, consisting of 245,000 tons in producing countries, 325,000 tons in consuming countries (excluding stocks in Russia and China, and stocks not available to industry in the United States, United Kingdom, and France), and 190,000 tons afloat.

Synthetic rubber production was estimated at 66,000 tons in August, 1952, 605,000 tons in January-August, 1952, and 584,000 tons in January-August, 1951. Consumption of synthetic rubber in the same periods was estimated at 67,500 tons, 575,000 tons, and 530,000 tons, respectively. Synthetic stocks at the end of August were placed at 172,500 tons.

World new rubber consumption (excluding Russian synthetic) declined from 1,552,500 tons in the first eight months of 1951 to 1,530,000 tons in the first eight months of 1952. U. S. consumption increased slightly from 808,114 tons to 811,505 tons, while foreign consumption, excluding China and Russia, declined from 641,500 to 614,500 tons.

Balloons in Cancer Research

According to a recent article in the *Journal of the American Medical Association*, a newly-designed balloon is being used in making tests for cancer of the stomach. The balloon's surface is roughened by 75 to 100 fragments of foam rubber which have been attached to the balloon with cement. A patient may swallow the balloon without difficulty, after which it is inflated in his stomach, nearly filling that organ. The balloon is inflated and deflated three times while in the patient's stomach. The wall of the stomach is thus brought into contact with the surface of the balloon. Cells from the stomach lining cling to the balloon. When the balloon is extracted, these cells are examined for signs of malignancy.

Rubber Shipment Control

The Malayan government, feeling that up-graded and poorly packaged shipments have hurt its natural rubber market in the United States, will put into effect on January 1, 1953, a rubber shipping and packing ordinance which provides strict penalties, including withdrawal of the right to do business, for habitual violators.

A government-named and supported Rubber Export Registration Board is now registering all Malayan rubber packers and shippers, according to the Natural Rubber Bureau. Special certificates issued by the board, which will also administer the punitive powers of the ordinance, will be required to do business after January 1, 1953.

Cecil F. Smith, a leading businessman in Singapore, now retired, heads the board. He has promised swift and domestic punishment for habitual offenders, those "who continuously have claims against their shipments for big amounts in Tokyo, New York and London." Violators ordered out of the business by the board can appeal to a three-man tribunal, composed of the High Commissioner of Malaya, the Governor of Singapore, and a leading judge.

The Natural Rubber Bureau, representing Malayan producers, said the new measures are a "major step toward correcting whatever deficiencies there may have been on the part of Malayan shipments." It pointed out that the ordinance is directed at middlemen and traders, rather than producers.

Points of Contention

Up-grading and sloppy packing by some overseas shippers has long been a point of contention between manufacturers of rubber products here and Far Eastern suppliers. Little was done about correcting it, until synthetic rubber, in recent months, emerged as a permanent large-scale competitor to natural rubber.

The Rubber Manufacturers Association currently is conducting educational seminars throughout the country to encourage small manufacturers to take an interest in the quality of the rubber they buy. Many have been unaware of their contract rights to get partial refunds for up-graded rubber, and many more have not been aware they were receiving up-graded rubber.

The president of the Federation of Rubber Trade Associations of Malaya, speaking in New York recently, urged a unified effort by rubber traders throughout the world to put their own houses in order. He recommended that they "ostracize habitual offenders and unscrupulous dealers. No doubt," he said, "many firms have been guilty of irregularities, malpractices and abuses which are unworthy of a great and thriving industry".

Malayan shippers, while generally conceding that some inferior rubber is being sent here, contend that some American dealers have also engaged in up-grading. "As in Malaya", a Singapore rubber dealer recently noted, "a few importers have impaired the reputations of all by delivering inferior parcels to small manufacturers."

Sees Increased Buying

Considering the price declines in Malayan rubber, the *Financial Times* of London recently stated that the United States will buy more natural rubber. So far this year, the publication reported, the average price of Malayan rubber is about 35c a pound against 60c a pound in 1951.

It was reported that United States manufacturers plan to scale down the proportion of 65% synthetic to 35% natural to 55/45 and eventually 50/50. The first step in the scaling-down process, the paper said, may take some weeks to achieve, but will mean an additional yearly consumption of 120,000 tons.

Meanwhile, shipments of natural rubber by Great Britain and her colonies to Russia increased more than 50% in the first half of this year, according to the British Board of Trade. The exports for the first six months of this year reached 64,873 tons as against 42,128 tons in the same period of 1951. Washington advices added, however, that the United States is much more bothered about rubber sales to Red China than to Russia. Ceylon is creating the number one problem in this field.

Other News of Interest

The NPA Chemical Division is now taking stock of its entire program of controls and expansion goals with an eye toward decontrolling wherever possible and revising goals wherever necessary. The major task now before the division is the determination of full mobilization requirements for important chemicals.

Controls administered by the division have dropped off to a handful. NPA Order M-45 now only covers allocation of two chemicals, methylene chloride and Thiokol, both of which are being considered for decontrol. At one time, 10 chemicals were under M-45 coverage.

NPA also acted, on October 17, to revoke its high tenacity rayon order, the last emergency control in the textile field. The regulation, M-13, was issued December 2, 1950, to spread the load of defense orders equitably over the rayon industry, NPA said. Originally, it limited the amount of DO-rated orders a producer must accept to 10% of his scheduled monthly production. This percentage was raised by successive amendments to 30%. In revoking the order, NPA explained that such control is no longer necessary in view of the small volume of rated business now being placed.

A Proposed Commercial Standard for Vinyl Film, submitted by the Society of the Plastics Industry, was to have been discussed at a meeting of the vinyl plastic film industry on November 18 at the National Bureau of Standards, Washington, D. C. The proposed commercial standard covers methods of test and requirements of general purpose vinyl plastic film to insure satisfactory consumer products.

The requirements and methods of test specify thickness tolerances, yield per roll, width tolerances, shrinkage at elevated temperatures, contamination, appearance, cracking, tensile properties, tear resistance, volatility of plasticizer, water extraction, low temperature impact and flammability. Suggested forms for declaring compliance with standard and an identifying hallmark are included.

Packaging Butyl Rubber

RFC, in a memorandum dated October 12, 1951, stated that due to the fact that certain purchasers of Butyl rubber could not handle film wrapped rubber, certain types of Butyl rubber, namely, GR-I-15, GR-I-17 and GR-I-18, would also be packaged in coated cartons. These polymers were designated GR-I-15-CC, GR-I-17-CC and GR-I-18-CC, and customers were requested to order them accordingly.

In addition to the foregoing types, GR-I, known in the past as "Standard GR-I", will be packaged both in film and in coated cartons, according to a new memorandum issued on October 30, 1952. Purchasers desiring this type packaged in coated cartons should order it as GR-I-CC on their purchase orders. All types of Butyl rubber not identified by the Suffix "CC" will be wrapped in film and shipped in uncoated cartons.

RUBBER DIVISION HOLDS HIGHLY SATISFACTORY MEETING AT BUFFALO

The 61st meeting of the Division of Rubber Chemistry of the American Chemical Society, held at the Hotel Statler in Buffalo, N. Y., on October 29, 30 and 31, was one of the most satisfactory meetings held by the Division in the past few years. Although official registration totaled only 806, it is estimated that approximately 1,000 members and guests were in the Buffalo area during the meeting, which was held apart from the parent society.

The meeting featured the presentation of 25 technical papers, a luncheon session of the 25-Year Club, presentation of the Charles Goodyear Lecture, plant visitations, a business session, announcement of newly-elected officers and directors, the suppliers' annual cooperative cocktail party, and the Divisional banquet. A special Ladies Entertainment Program, under the direction of Mrs. C. H. Peterson, was another feature, one of the activities being a planned visit to Niagara Falls.

Technical Papers Well Received

Every technical session at the meeting was well attended and considerable discussion from the floor followed almost every paper, complete abstracts of which appeared in our previous issue. Among new data presented in the papers were reports on the skidding of tires on ice, new developments in silicone rubber for use at extreme temperatures, studies of vulcanization with radioactive sulfur, a new radioactive method for measuring the penetration of gases into inner tubes and rubber sheet materials, and a new class of materials for extending and modifying rubber.

Among other reports made at the meeting were those covering the use of DuPont Silica GS-119-S in silicone rubber, latest developments in the application of Hypalon S-2, use of activated carbon to produce white tire sidewalls made largely of reclaimed rubber, new GR-S polymers extended with rosin type acids, introduction of new types of emulsifiers for use in butadiene-styrene polymerizations, and some interesting data on the characterization of cord fatigue in tires.

In connection with its current campaign to acquaint rubber manufacturers with proper procedures on the inspection and acceptance of natural rubber shipments, the Rubber Manufacturers Association exhibited its panel displays which are shown at the seminars now being held at various rubber centers. In addition, a paper on "Purchase and Inspection Standards for Dry Natural Rubber," prepared by C. O. Miserentino (Dunlop) and W. J. Sears (R.M.A.), was presented by Mr. Sears. The industrial exhibit which portrays the numerous applications of the relatively new silicone materials, including silicone rubber, was maintained by the Dow Chemical Co. at the Statler and attracted many visitors.

Name Officers for 1952-53

The highlite of the business meeting, which was held on Friday morning, October 31, was the announcement of newly-elected officers and directors based on the usual letter ballot. These are: *Chairman*, Seward G. Byam (DuPont); *Vice-Chairman*, James C. Walton (Boston Woven Hose); *Secretary*, Charles R. Haynes (Binney & Smith); *Treasurer*, Amos W. Oakleaf (Phillips Chemical).

The following men, representing local areas, were elected directors for two-year terms: *Akron*—C. A. Ritchie (Goodrich); *Boston*—J. L. Haas (Hodgman Rubber); *Buffalo* — C. O. Miserentino (Dunlop Tire); *Chicago*—A. E. Laurence (Phillips Chemical); *Fort Wayne* — C. S. Yoran (Brown Rubber); *Los Angeles*—G. W. Miller (Firestone); *New York* — G. N. Vacca (Bell Telephone Labs.). R. B. Stringfield (Fullerton Mfg.), the defeated candidate for vice-chairman, becomes delegate-at-large. The Tellers' Committee consisted of R. A. Emmett (Binney & Smith) as chairman and R. G. Seaman (*India Rubber World*) and G. H. Swart (General Tire). By action of the Executive Committee, Waldo Semon (Goodrich), the retiring chairman, was named councillor of the Division, with Howard Cramer (Sharples Chemical) as alternate.

In opening the business session, Chairman Semon reported that meeting dates for the next five meetings had been established, as follows: March 18-20, 1953—Hotel Statler, Los Angeles, Calif.; May 27-29, 1953—Hotel Statler, Boston, Mass.; September 9-11, 1953 — Hotel Sherman, Chicago, Ill.; April 14-16, 1954 — Hotel Brown, Louisville, Kentucky; September 15-17, 1954—Hotel Commodore, New York, N. Y. Both the Los Angeles and Chicago meetings in 1953 will be held in conjunction with the parent society. No business meeting will be held at Los Angeles.

Three amendments to the by-laws of the Division were proposed and approved at the session, the substance of them being as follows:

(1) Each director shall have an alternate who can meet with the Executive Committee when necessary and have full authority as a director. The alternate shall be the defeated candidate in each election. If neither the director nor his alternate can attend a meeting, the director has full authority to name a second alternate.

(2) Councillors of the Division are now full-fledged members of the Executive Committee.

(3) Terms of the councillors have been increased to three years, but terms of the elected councillors are not to run concurrently.

Reporting as chairman of the Finance Committee, Mr. Walton stated that in view of rising publishing costs on both *Rubber Chemistry and Technology* and the Rubber Bibliography, the committee proposed that membership dues in the Division be increased as follows: A.C.S. Members—from $2.50 to $4.00; Associate Members—from $5.00 to $6.50; Companies and Libraries—from $5.00 to $7.50. A motion to this effect was made and carried. J. J. Hoesley (Goodyear), chairman of the Membership Committee, reported that as of October 25, Division membership amounted to 3,294.

It was further reported that publication of the Rubber Bibliography had been approved for the next three years, each edition to cover three years, and that the Bibliography Committee, of which John McGavack (U. S. Rubber) is chairman, hopes to catch up to an annual edition basis by 1956. It was also stated that the monograph on synthetic rubber, sponsored by the Division, is now in the hands of the printer, but that copies would probably not be available until next September. The book will run to approximately 1150 pages.

Chairman Semon stated that the financial status of the Division, despite rising publishing costs and increased costs in general, were still in good condition. He also indicated that the Rubber Library maintained by the Division at the University of Akron, the services of which are steadily being more widely used, would be continued and that many of the Division's activities might eventually be centralized at that library. He announced that the recently-organized Fort Wayne Rubber & Plastics Group had been accepted by the Division as a sponsored group.

Before closing the business session, Dr. Semon, the retiring chairman, expressed his thanks to his fellow officers and others who had worked with him during his regime. In turn, Mr. Byam, the incoming chairman, paid a special tribute to Dr. Semon for the fine work he had performed as both vice-chairman and chairman of the Division. During the session a minute's silence was observed for two members whose deaths had been reported since the previous meeting, namely, William S. Calcott and W. W. Higgins.

Simmons Gives Goodyear Lecture

Another highlite of the meeting was the presentation of the Charles Goodyear Lecture by Dr. H. E. Simmons, for many years president of the University of Akron and currently associated with the Goodyear Tire & Rubber Co. The lecture was given at the end of the technical session on Thursday morning, October 30.

Taking as his subject "Out of the Past," Dr. Simmons related several anecdotes covering personal experiences with the rubber field since he first became professor of chemistry at the University of Akron in 1910. He first told of the roadside difficulties experienced by motorists with the early white tires, especially in fixing flats. He described some of the acetone extraction tests which were popular in the 1910-15 period, and told how doctors recommended that rubber workers drink plenty of milk to lessen the health hazards of aniline oil. He said it was not uncommon to find bottles of milk in every compounding room. He also told of the extensive use of thiocarbanilide in masterbatching, and how such use was secretively guarded by the compounders.

Dr. Simmons outlined, in brief, the organization of the Rubber Section of the American Chemical Society in 1909, predecessor to the present Division of Rubber Chemistry, and told of the reticence of the rubber companies to reveal their methods of analysis. He attributed the breakdown of this reticence to the research expansion which occurred in the rubber industry after World War I, and cited the titles and nature of the papers given at the 1920 meeting as evidence of this new attitude. Other reminiscences recalled the introduction of carbon black into tires and some of the industry's early litigation, including the now-famous suit over a method of cur-

ing rubber at room temperature (U. S. Rubber vs. Miller Rubber).

In concluding his lecture, Dr. Simmons paid tribute to the leadership of the Rubber Division which resulted in publication of *Rubber Chemistry and Technology* and the organization of the Rubber Library. He recalled the excellent cooperation which the rubber industry exhibited during the trying days of World War II and emphasized the research work on rubber which has been done and is being done at the University of Akron.

Luncheon and Banquet Held

As usual, the initial activity at the meeting was a luncheon session of the 25-Year Club, with H. F. Van Valkenburgh (Dunlop Tire) presiding as chairman. A minute's silence was observed for four members who had passed away since the last meeting of the club, including W. W. Higgins and J. R. Morath. New members were asked to stand and take a bow, among these being Carl Sweitzer (Columbian Carbon), Henry Peters (Bell Telephone Labs.), Dick Opper (Naugatuck Chemical), Ed Damon (Phillips Chemical), and John Snyder (Binney & Smith).

The two oldest members in point of service present at the meeting were Charles Haynes (Binney & Smith), with over 45 years, and W. E. Kavenagh (Goodyear), with over 50 years. Following established practice, Mr. Kavenagh will receive a memento from the club. It was announced that the next meeting of the club will be held during the Boston meeting next spring and that Mr. Kavenagh would preside as chairman.

The Divisional banquet was held on Thursday evening, October 30, in the Grand Ballroom of the Hotel Statler, and was immediately preceded by the Suppliers' Cooperative Cocktail Party, with well over 100 suppliers contributing funds to make the party successful. J. H. Nesbit (U. S. Rubber Reclaiming) acted as chairman of this event.

Highlite of the banquet, attended by approximately 610, was the presentation of the Charles Goodyear Medal to Dr. Simmons. Before the presentation, E. R. Bridgwater (DuPont) reviewed the work of the Medalist, whose life work, he said, was spent in "hatching experts." He paid special tribute to Dr. Simmons as an educator, a scientist and a public-spirited citizen, and told of his love for his four children and eight grandchildren. He also revealed that Dr. Simmons was one of the best all-around athletes to attend Buchtel University (forerunner of the University of Akron), and described some of his baseball activities around 1906. Dr. Simmons' 67th birthday coincided with the presentation of the Medal, which was made by Dr. Semon. In accepting the Medal, Dr. Simmons expressed his deep gratitude for the honor.

Local Arrangements Committee

The smooth functioning of a Divisional meeting is due mainly to the efforts of the Local Arrangements Committee, and the Buffalo meeting was no exception. Special thanks are due to J. G. Augenstein (U. S. Rubber Reclaiming), who acted as chairman, and E. C. Siverson (Buffalo Weaving & Belting), vice-chairman. Thanks are also due to the following individuals who were in charge of various functions:

Equipment and Meeting Rooms, Paul Sick (Hewitt-Robins); *Registration,* Charles Miserentino (Dunlop Tire); *Finance,* Charles Smith (U. S. Rubber Reclaiming); *Information,* Russell Schutz (U. S. Rubber Reclaiming); *Publicity,* Robert Mack (Buffalo Weaving & Belting); *Plant Visitations,* William Sauter (DuPont); *Banquet and Entertainment,* Donald Bradley.

PROMOTION OF HAGER AND TIDBALL ANNOUNCED BY B. F. GOODRICH CO.

Rollin D. Hager

Lee D. Tidball

Rollin D. Hager has been appointed general manager of industrial products manufacturing for the B. F. Goodrich Co., while Lee D. Tidball, formerly production superintendent of the Industrial Products Division, has been appointed general superintendent succeeding Mr. Hager. Mr. Hager will be responsible for company operations in the Industrial Products and Sundries Divisions in Akron, and plants located at Clarksville, Tenn.; Cadillac, Mich.; Marion, Ohio; and DuBois, Penna. He joined Goodrich in 1925 as a clerk. Mr. Hager is a graduate of Penn State University. In 1937, he was named production superintendent of the Cadillac plant, and during World War II was production superintendent of the Lone Star Defense Corp., Texarkana, Texas. He became assistant general manager and later manager of the defense plant before the war ended. In 1943, he returned to Akron to become production superintendent of the Industrial Products Division, and was made general superintendent in 1945.

Mr. Tidball has been with the company since 1922. He took courses in civil engineering at Hiram University and at Ohio State University. His first position with Goodrich was at the Miller plant in time study. In 1931, Mr. Tidball was appointed supervisor of that work at Plant 4 and eight years later became staff superintendent. In February, 1947, he became staff superintendent of the Industrial Products Division and in November of that year was appointed manager of the Molded Goods Department.

Goodyear Gets $100,000,000 Credit

A $100,000,000 standby credit has been obtained by the Goodyear Tire & Rubber Co. from a group of banks, it was recently announced. The funds will be available to the company at any time during the next five years. No borrowing is contemplated under the arrangement, it was explained. Working capital of the company amounts to about $400,000,000 and there are no bank loans outstanding. The new credit was granted on the company's own responsibility for general purposes.

Tingley Non-Skid Rubbers

New non-skid shoe rubbers, molded with built-in rubber cleats, are now being made by the Tingley Rubber Corp. of Rahway, N. J. They are built to give extra traction on wet golf course grass, ice and snow, or other uncertain footing. The new rubbers are molded in one piece and the average weight per pair is 14 ounces. They fold compactly and may be carried in pocket, grip or golf bag. The rubbers are made in three sizes—small, medium and large. The company states that longer wear life and better surface abrasion resistance is provided in the rubbers by adding Good-rite Resin 50 to the sole compound.

Brown & Blauvelt Move Offices

The consulting engineering firm of Brown & Blauvelt has announced the consolidation of its New York offices at 468 Fourth Avenue, New York 16, N. Y. The new telephone number is LExington 2-7581. H. Walter Grote, well-known rubber technologist and engineer, has been associated with the company for some time.

NPA Amends Narragansett Charges

The National Production Authority, on October 6, filed a motion to amend its 52-count statement of charges against the Narragansett Wire Co., Pawtucket, R. I., and the Texas Wire & Cable Co. of Dallas, Texas. The original statement of charges claimed violation of NPA regulations by alleged false statements in applications for allocations of copper and misrepresentations regarding the relationship between the two firms. A hearing on a bill of particulars, asked by Narragansett, was held in Boston, Mass. on September 19. Requests by the company for detailed statements on all copper allocations made by NPA and for more specific information as to the manner in which the violations were committed were denied at that time. Under the amended statement of charges, counts 51 and 52 were revised to indicate that the Messrs. Morley and Stiles, officers of Narragansett, exerted their influence to have the Pawtucket firm give $100,000 to Texas Wire so that the latter could submit applications for allocations of copper and copper-base alloys. A 53rd count added that Narragansett Wire "directed, supervised, and participated in the commission of the violations." It also claims that the Narragansett firm "caused the Texas respondent to file applications and reports with NPA containing materially false statements for the specific purpose, and with the effect, of procuring allotments of copper and copper-base alloys for the use and benefit of the Narragansett respondent, well knowing the Texas respondent had no plant, machinery, production facilities or production employees of its own."

Testing Jet Airliner Tires

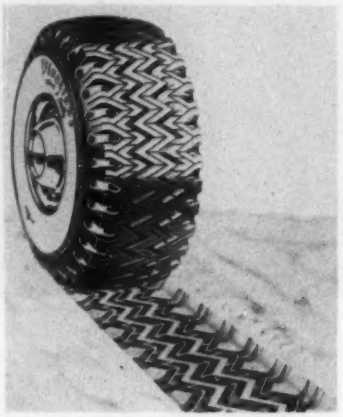
More progress in the accelerated program of U. S. manufacturers to produce jet airliners was indicated in a recent announcement by the B. F. Goodrich Co. that tires for new high-speed aircraft have been developed and are now undergoing tests. It was indicated that tires for the jet airliners may be of the tubeless type. Goodrich has pointed out that it had developed a tire for military jets that will withstand 50 landings at speeds of 250 miles an hour and that this experience was of "considerable value" in developing a tire for commercial jets. It was estimated that U. S. jet airliners will land at speeds of about 160 miles per hour and that air pressure in their tires will be approximately 135 pounds per square inch. The new tires, Goodrich stated, will reduce the over-all weight of aircraft, simplify assembly and provide more uniform inflation pressure.

ARCO Hand-Line Throwing Weight

Automotive Rubber Co., Inc., Detroit, Mich., has introduced the "ARCO Hand-Line Throwing Weight," especially for field use by telephone and power linesmen. Consisting of a lead core sheathed in a thick, sponge rubber shell, the assembled weight is then heavily coated with a smooth, tough, resisilent, black rubber outer lining. The dimensions are 4½ inches long by 3 inches in diameter at the widest point. The total weight is 13½ ounces.

Town and Country Winter Tire

What is said to be the first passenger car tire to be completely designed and engineered for safe driving on snow and ice-covered roads is now available from the Firestone Tire & Rubber Co. According to the company, the tire is radically different in design and has many new construction features. It also is the first winter tire to be made available with either white or black sidewalls. Known as the "Town



and Country", the tire has circumferential tread ribs which are crosscut to provide the hundreds of flexible tread elements which assure safer stops and sure starts. The continuous tread design formed by the interlocking non-skid bars give the tire a quietness and smoothness never before achieved with traction-type tires, the company maintains. The wide, flat tread with its deep traction elements not only assures maximum traction on slippery surfaces, but also provides longer mileage. Available in all popular sizes, the white sidewalls of the tire are protected by a circumferential rubber curb guard.

Claims Inner Tube Obsolescent

Speaking before the Milwaukee Advertising Club recently, Frank T. Tucker, director of advertising for the B. F. Goodrich Co., stated that the inner tube may soon become a relic of the past. He pointed out that his company has already delivered more than a million tubeless tires to American motorists. The present rate of tubeless tire production at Goodrich plants is nearly triple that of last year as a result of new standards of safety, service and mileage which the new tire has established, he said. Many new car manufacturers are considering tubeless tires as original equipment, he disclosed.

Glidden Offers Latex Enamel

What is said to be the first latex emulsion base interior enamel ever developed will be marketed next spring by the Glidden Co. The new latex base enamel will be produced in a full range of colors from deep tones to pale pastels. According to the company, the new latex base enamel is designed primarily for interior woodwork, bathroom and kitchen walls. The company is already producing a line of latex base flat paints.

Polyplastex Shows Unique Line

New, unusual materials and designs created and developed by Polyplastex United, Inc., New York, N. Y., incorporating colorful fabrics, grass, yarns, botanical matter and other natural materials with Vinylite plastic and resins were recently shown at a special exhibit in New York City. Three types of materials were featured at the showing: Polyplastex "Synskyn" which is a decorative blending of Vinylite resins and Fiberglas; "Panlam," a rigid laminate consisting of two Vinylite plastic rigid sheets with fabric or other decorative material locked in between; and "Panflex" that has a similar sandwich-type construction made of flexible Vinylite film and sheeting. Featured for the first time at the showing, the new flexible laminates were displayed principally as textured upholstery as well as wall paneling and table tops. Rigid laminates incorporating such exotic materials as ostrich feathers, fabrics, tinted leaves and grass, etc., are used to best advantage in decorative screens, room dividers, vertical blinds and lampshades. Unusual, new patterns were also shown in translucent Synskyn, widely used for lampshades. Window draperies were also exhibited as a new development in coated textiles.

WSB Defends Wage Raise

Archibald Cox, chairman of the Wage Stabilization Board, has issued an opinion justifying the board's recent approval of a 10c hourly wage increase for rubber workers on the basis of a tandem relationship to the automobile industry. Mr. Cox said that 5.2c an hour for Goodyear workers, 5c for Goodrich and 4.1c an hour were available to U. S. Rubber Co. workers under the board's cost-of-living regulation. He said the board decided the additional 5 to 6c was justified to maintain the close wage relationship between the automobile and rubber industries. Mr. Cox observed that, although the board is anxious to maintain such relationships, it will not approve that sort of increase without regard to its amount. In the present case, he said, WSB has concluded that under all the circumstances the 10c an hour increase will not be unstabilizing.

New Office for Titanium Pigment

Titanium Pigment Corp., subsidiary of the National Lead Co., has announced the opening of a new sales office in Atlanta, Ga. The added office, which will be located at 367 John St., N. W., will serve the southeastern states in the sales of "Titanox" pigments. The Alabama and Tennessee sales territories, formerly under the jurisdiction of the Cleveland office, will be added to the newly-opened Atlanta office. Robert E. Noyes, formerly a sales representative in Cleveland, will be in charge of the Atlanta office. Replacing Mr. Noyes in Cleveland will be Paul Eliot, who is being transferred from the technical services laboratories in New York City. Also announced was the transfer of G. Gordon Hennessy from the technical service laboratories to Chicago, Ill., where he will be a sales representative.

NPA Lifts Curbs on Sulfur

The National Production Authority, in a revocation of Order M-69 on November 5, decontrolled sulfur, declaring that supplies have caught up with demand after 17 months of control. As amended on January 1, 1952, when sulfur was particularly short, M-69 restricted sulfur use to 90% of 1950 consumption and provided full support for certain essential defense and civilian requirements. As originally issued on June 1, 1951, the order limited users to 100% of 1950 use. It was pointed out by NPA officials, that improved supply and inventory resulted in large part from a drop in consumption during the first eight months of 1952. Some consumers have been using only 80% of their 1950 usage for some months. NPA apparently ignored the objections of both the International Materials Conference and the U. S. State Department, both of which opposed decontrolling sulfur while it remains under international allocation. NPA said that the revocation of M-69 would in no way affect the ability of the United States to meet any export requirements for essential foreign needs which have been or may be assumed by the United States.

Planning New De-Icing Units

A meeting of Goodyear Tire & Rubber Co. engineering personnel with members of the National Aeronautical Establishment of Canada design group was held recently in Akron to complete plans for designs for de-icing equipment to be installed on the Establishment's "Rockcliffe Ice Wagon," flying laboratory experimenting in aeronautical icing protection. The experimental plant itself, a DC-4M (built by Canadair, Ltd.), has been flown to Akron to facilitate correlation of present Goodyear designs with actual structure. The N.A.E. was among the first organizations to attempt a scientific study of the effects of ice on aircraft, commencing active development work on propellers in 1939. Its "Rockcliffe Ice Wagon" is actually the group's low-temperature laboratory. Already fitted out with Goodyear-manufactured electrothermal de-icing equipment on its propellers and dorsal fin, the plane will soon undergo installation of new Goodyear equipment on the leading edges of its wings, fins and horizontal stabilizers.

Appoints New Purchasing Agents

The appointment of new purchasing agents for the Baton Rouge, La., and Painesville, Ohio, plants of the Naugatuck Chemical Division of the U. S. Rubber Co., was recently announced. Andrew McNeill, formerly purchasing agent at the Painesville plant, has been transferred to the Baton Rouge plant. Mr. McNeill, who has a degree in chemical engineering from Northwestern University, has been with the division since 1947. John Brady, formerly a senior buyer of heavy equipment at the Naugatuck, Conn., plant, has been transferred to Painesville as purchasing agent. Mr. Brady, who has a degree in chemical engineering from the University of South Carolina, originally joined the division in 1950.

At your age!

If you are over 21 (or under 101) it's none too soon for you to follow the example of our hero, Ed Parmalee (above) and face the life-saving facts about cancer, as presented in our new film "Man Alive!".

You and Ed will learn that cancer, like serious engine trouble, usually gives you a warning and can usually be cured *if treated early.*

For information on where you can see this film, call us or write to "Cancer" in care of your local Post Office.

American Cancer Society

News in Brief

The Associated Tire and Accessories Division of B. F. Goodrich has released a new 16mm color-sound motion picture entitled "The Sound of Bells" dealing with tire merchandising problems.

"Effect of Neoprene on Smudging Characteristics of Carbon Black Colored Papers" is the title of a new technical report published by the Rubber Chemicals Division of DuPont. Ask for technical report PR-2.

Trix Stix, Inc., New York, N. Y., has introduced a new creative novelty item for children and adults which consists of linking small sticks made of flexible Bakelite polyethylene into caricatures of people, animals, buildings and just about anything else.

Rogers Tool & Die Co., Akron, Ohio, is using Hycar rubber for the valve seat and gasket in a new midget cook stove it is manufacturing for use by the U. S. Army.

Automobile heater hose is now being shipped to the trade by the Gates Rubber Co. in a new type of double-duty corrugated container. In addition to being a basic shipping container, the unit functions as a dispenser.

Mansfield's Position Improving

Some interesting information pertaining to the growing position of the Mansfield Tire & Rubber Co. in the over-all rubber field was recently published in the *Akron Beacon Journal*. For example, the article reported that the company, now in its fortieth year, is sixth in total dollar sales among the 20-odd tire firms, and ranks fifth in actual units produced, trailing only the Big Four. Although Mansfield tops General Tire & Rubber Co., its close associate in recent years, in the number of tires produced, General Tire's combined sales in 1951 were nearly three times that of Mansfield, the figures being $170,771,000 against $63,431,000. Although Mansfield markets its own line of tires it is also a large producer of private brands, including the Riverside tire for Montgomery-Ward and the Pure tire for the Pure Oil Co. In the field of private brand tires, the company is second only to U. S. Rubber. General Tire currently owns approximately 43% of Mansfield stock.

Gillman Joins Bishop Mfg.

Bishop Manufacturing Corp. of Cedar Grove, N. J., has announced the appointment of Harmon H. Gillman as technical director. Mr. Gillman will continue the development of existing products plus a new line of rubber and plastics products. Mr. Gillman has been associated with the rubber industry for the past 14 years. His last position was manager of the Materials Division of the Gates Rubber Co., where he served in various executive capacities for the past 12 years. Mr. Gillman is a member of the American Chemical Society, the American Institute of Chemical Engineers and has contributed many articles to the technical literature. He received his B. S. degree in chemical engineering from the Massachusetts Institute of Technology.

Technical Tape Buys W. Ralston

Technical Tape Corp., New York, N. Y., has purchased W. Ralston & Co. of Old Bridge, N. J. The Ralston company makes waterproof and reinforced papers which are utilized in varied industrial fields and for packaging purposes. Under the new arrangement, the Ralston business will be conducted as an affiliate of Technical Tape with sales of related products to be handled through the distributive channels of both corporations. Ralston's plant facilities will be operated as heretofore with no change in personnel. Its executives personnel, however, will be transferred to Technical Tape headquarters.

R.I. Group to Hear Litzler

The November 20th meeting of the Rhode Island Rubber Club at the Metacomet Golf Club in East Providence, R. I., will feature an address by C. A. Litzler, president of Industrial Ovens, Inc. Mr. Litzler will speak on the "Surface Coating and Impregnation of Fabric." Dinner and a program of entertainment will complete the meeting.

VACCA AND BRECKLEY ELECTED OFFICERS OF NEW YORK GROUP

The October 24th meeting of the New York Rubber Group held at the Henry Hudson Hotel in New York City attracted about 225 members and their guests. The meeting featured an election of officers for the 1953 season and the presentation of technical papers by Dr. A. Szegvari of the Union Process Co., Akron, Ohio, and Dr. Harry L. Fisher, special assistant to the director of the Office of Synthetic Rubber, Reconstruction Finance Corporation, Washington, D. C. The following members were elected to office:

Chairman, George Vacca (Bell Telephone Labs); *Vice-Chairman*, J. Breckley (Titanium Pigment); *Secretary-Treasurer*, B. B. Wilson *(India Rubber World)*. R. R. Sterrett (Naugatuck Chemical) was elected sergeant-at-arms. Four members were added to the Executive Committee for a three-year term. They are: S. W. McCune (DuPont), C. O. Davidson (Binney & Smith), W. E. Caton (Pawling Rubber), and Newell Perry (Thermoid). In addition, J. S. Corrigal (R. T. Vanderbilt) and P. P. Pinto (RUBBER AGE) were named ex-officio members of the Executive Committee. W. S. Rea (United Carbon) resigned from the Executive Committee because of his being transferred from New York to San Francisco. S. M. Martin, Jr. (Thiokol) served as chairman of the Nominating Committee.

In his paper on "Fine Grinding of Latex Dispersions," Dr. Szegvari pointed out that dispersions used in latex compounds have to be much finer than usual commercial dispersions; otherwise, they are not incorporated properly in most deposition processes. Trouble-free work in latex plants is based on best dispersions with finest particle size. One requires finer subdivision of pigments in latex methods than in mill mixing of rubber, he said.

The most important ingredients in latex compounding are the solids, which are ground or "dispersed" in pebble mill type equipment or Attritors. Liquid ingredients are best processed in colloid mills, and the resilient materials, like reclaim, in internal mixers.

The Attritors, the newest fine grinding equipment, grind, according to available production records, 8 to 10 times faster than conventional mills. They have a stationary grinding tank; the charge to be ground, together with very small grinding stones, are kept in continuous interaction by a specially designed agitator. A cooling jacket provides temperature control during the grinding. There is a permanent access to the grind which can be inspected any time and corrections made whenever necessary. The Attritors have very low power consumption and occupy little floorspace, he emphasized.

Satisfactory dispersion processing requires both well engineered equipment and also good chemical formulation. One should ensure compatibility of all ingredients, in particular dispersing of agents, and all processing steps, which is much more important for latex processing than with conventional mill mixing of rubber goods, Dr. Szegvari concluded.

Latex Paint Growth

Some data on the rapid production growth of latex emulsion paints was recently compiled by the United States Gypsum Co. According to the company, estimated production of these paints was 4,000,000 gallons in the last half of 1949, reached 9,000,000 gallons in 1950, and jumped to 20,000,000 gallons in 1951. Production in 1952 is expected to be between 30,000,000 and 40,000,000 gallons. At present, over half of the sales of interior paints of the major manufacturers are latex based.

Dr. Fisher spoke on "Latest Developments in Synthetic Elastomers." The speaker explained that of the two types of GR-S now being manufactured about 45% is cold rubber, that is, GR-S polymerized at 41°F. instead of 122°F. Cold GR-S is better than natural rubber for tread wear but natural rubber still develops less heat and is better for carcass stocks. Oil-extended and plasticized GR-S gives tread wear as good as or slightly better than cold GR-S.

Nitrazole CF is used as an initiator to produce a product at 122°F. that is approximately the same in its properties as cold GR-S polymerized at 41°F. It is the first instance where an initiator has led to a structural change. Other monomers, redox systems, and reinforcement by carbon black were discussed.

The weight method was said to be better than the depth method for evaluation of the tread wear. A stainless steel screen was advocated in place of garnet paper for National Bureau of Standards abrader. GR-S type of copolymers for low-temperature service should contain not over about 16% styrene, he said. Aging tests now lean toward the action of ozone. New work on cold GR-S latex, adhesives, sodium elastomers, and Alfin polymers were included.

Neoprene Type WRT, he noted, is a modification of Type W with greater resistance to crystallization and a high degree of resistance to compression set. A minor degree of scorch is introduced into Butyl rubber by small additions of p-dinitrosobenzene.

Silicone rubber with a tensile strength of approximately 2000 psi and elongation of 625% by means of ultra-fine silica has also just been announced. The mechanism of vulcanization of polyacrylic rubbers involves a Claisen reaction with loss of alcohol. Hypalon S-2 is a new elastomer prepared by the chlorosulfonation of polyethylene. It can be vulcanized by different agents, has excellent weathering properties, and needs no carbon black for reinforcement.

The German Vulcollan, which also needs no carbon black for reinforcement, is prepared from adipic acid and ethylene glycol, and vulcanized with a diisocyanate and water or glycol. It can only be handled under special conditions, is very strong, is rather expensive, and at present is only in the pilot plant stage, he concluded.

ONTARIO RUBBER SECTION HEARS INTERESTING TALK BY SWEITZER

The October 14th meeting of the Ontario Rubber Section of the Chemical Institute of Canada held at Hart House, University of Toronto, Toronto, Ont., heard an interesting paper by Dr. C. W. Sweitzer, director of research at the Columbian Carbon Research Laboratories, Brooklyn, New York. Dr. Sweitzer spoke on "The Role of Carbon Gel in Reinforcement of Rubber and New Developments in the Carbon Black Field."

In his paper, Dr. Sweitzer stated that the two fundamental properties or "dimensions" of rubber carbons that determine to a large extent their ultimate behavior in rubber are fineness and structure (pH or surface chemistry is a third dimension). In a graphical chart employing fineness and structure as coordinates it is possible to locate all the rubber carbon grades. From the known correlations between fineness of carbon and tensile in rubber on the one hand, and structure of carbon versus modulus and processing in rubber on the other hand, it is then possible to predict broadly from this chart the expected physical behavior in rubber of all rubber carbons. The new fine furnace blacks from oil fall into this dimensional chart, occupying areas previously unoccupied. Basically then it is their dimensions rather than their oil history that determines their rubber properties, he said. As was true with the channel blacks so with these finer oil blacks the ultimate limit will be determined by the compromise between processing and hysteresis on the one hand versus tensile and modulus on the other hand.

Recognition of the carbon gel complex in 1949 as a fundamental factor in the carbon reinforcement of cold rubber has provided a new approach for following the development of the carbon-rubber bond and for evaluating the role of this complex in the reinforcement of all rubbers, Dr. Sweitzer opined.

The mechanism involved in the development of the carbon gel complex is primarily adsorptive. In the initial stage the carbon black is completely wetted by the polymer with the coincidental development of primary carbon-rubber adsorption bonds. In the second stage these primary colloidal carbon gel units are knitted or cross-linked into an insoluble lattice co-extensive with the unvulcanized stock, this lattice setting the pattern for the optimum tensile development in the vulcanizate. In the third stage this carbon gel lattice can be stiffened through further cross-linking, by additional heat, this stiffening setting the pattern for enhanced modulus development in the vulcanizate.

The increased carbon gel level in the vulcanizate is associated with higher stiffness as measured by modulus. This stiffening effect can also be measured by stress-strain tests on test rings prepared from the unvulcanized stock. Since in these tests on the unvulcanized polymer-carbon masterbatch no bridging agent is involved, it is concluded that carbon gel is the significant factor in the carbon reinforcement of all unsaturated polymers.

ASME RUBBER-PLASTICS GROUP COMPLETES PROGRAM FOR MEETING

An extensive program covering the presentation of twelve papers, including two special reports on rubbers and plastics, has been arranged by the Rubber and Plastics Division of the American Society of Mechanical Engineers for its annual meeting. The meeting will be held on Thursday and Friday, December 4 and 5, at the Hotel Statler in New York City in conjunction with the annual meeting of the parent society.

The papers on rubber will be presented at morning and afternoon sessions on Thursday, December 4. The morning session will feature the three following papers: *Mechanical Properties of Hypalon S-2,* by A. Stockfleth (DuPont); *Mechanical Applications of Flowed-In Gaskets,* by W. M. Rand, Jr. (Dewey & Almy Chemical), and *The Room Temperature Compounding Process,* by W. B. Wines (Western Electric). R. H. Gerke (U. S. Rubber) and G. C. Maassen (Vanderbilt) will preside as chairman and vice-chairman, respectively, at this session.

The afternoon session will feature the following papers: *Measurement of Tread Wear,* by R. D. Stiehler, G. G. Richey, and J. Mandel (National Bureau of Standards); *Creep of Neoprene in Shear under Static Conditions: Ten Years,* by W. Newlin Keen (DuPont), and *Selected Rubber References for the Mechanical Engineer—July, 1951—June, 1952,* by Leora Straka (Goodyear) and Betty Jo Clinebell (University of Akron). Fred Conover (Manhattan Rubber) and Max R. Karrer (Electric Woven Hose) will preside as chairman and vice-chairman, respectively.

Plastics Sessions Scheduled

The six papers on plastics have also been divided into two sessions to be held on Friday, December 5. The morning session will feature the following papers: *The Effect of Biaxial Stretching on the Crazing Resistance of Transparent Acrylic Plastics,* by G. M. Kline and A. Axilrod (National Bureau of Standards); *Stress Crazing of Plastics,* by J. A. Sauer and C. C. Hsiao (Pennsylvania State College), and *Design Factors for Injection Molding Heating Cylinders,* by Gerald D. Gilmore and Gordon B. Thayer (Dow Chemical). James M. Church (Columbia University) and Bryce Maxwell (Princeton University) will preside as chairman and vice-chairman, respectively.

The afternoon session will comprise the following: *Effects of Defects on Strength Properties of Plastic Laminates,* by B. G. Heebink and A. A. Mohaupt (Forest Products Laboratory); *Effective Control of Lead Dust in the Manufacture of Vinyl Plastics,* by A. E. Goss (Connecticut Department of Health) and A. M. Ross, Jr. (Ross & Roberts), and *Selected Plastic References for the Mechanical Engineer—July, 1951-June, 1952,* by Helen Dikeman and Karl Schmieder (Monsanto Chemical Co.). H. F. Wakefield (Bakelite) and Roy Platow (U. S. Plywood) will act as chairman and vice-chairman, respectively, at this session.

Coming Events

Dec. 4. Ft. Wayne Rubber and Plastics Group, Hotel Van Orman, Ft. Wayne, Ind.

Dec. 12. Boston Rubber Group, Hotel Somerset, Boston, Mass.

Dec. 12. Detroit Rubber & Plastics Group, Xmas Party, Detroit-Leland Hotel, Detroit, Mich.

Dec. 12. Los Angeles Rubber Group, Xmas Party, Hotel Statler, Los Angeles, Calif.

Dec. 12. New York Rubber Group Xmas Party, Henry Hudson Hotel New York, N. Y.

Dec. 13. So. Ohio Rubber Group, Miami Valley Golf Club, Dayton, Ohio.

Dec. 16. Buffalo Rubber Group, Xmas Party.

Dec. 19. Chicago Rubber Group, Xmas Party, Morrison Hotel, Chicago, Ill.

Feb. 13, 1953. Detroit Rubber & Plastics Group, Detroit-Leland Hotel, Detroit, Mich.

Mar. 18-20, 1953. Rubber Division, A.C.S., Hotel Statler, Los Angeles, Calif. (In conjunction with 122nd meeting of A.C.S.).

May 27-29, 1953. Rubber Division, A.C.S., Spring Meeting, Hotel Statler, Boston, Mass.

Sept. 9-11, 1953. Rubber Division, A.C.S., Fall Meeting, Hotel Sherman, Chicago, Ill.

DETROIT GROUP HEARS GARVEY; PLANS TWO COURSES IN RUBBER

Approximately 200 members and guests of the Detroit Rubber and Plastics Group attended the October 3rd meeting held at the Detroit-Leland Hotel, Detroit, Mich. Principal speaker of the evening was Dr. B. S. Garvey, Jr., director of the Rubber Service Sales Laboratory of Sharples Chemicals Inc. Dr. Garvey spoke on "The Compounder in the Rubber Industry."

The speaker stressed the importance of having the compounder see the relationship of compounding to the entire rubber industry. Dr. Garvey traced the historic development of the various rubber polymers and gave structural formulas, outlined their specific characteristics and noted some of the compounding eccentricities of each.

The Educational Committee of the group has drawn up an outline of two rubber courses which may be given at Wayne University under the sponsorship of the Detroit Rubber and Plastics Group. In order to determine the potential interest in such courses, members are polling their respective companies.

QUEBEC GROUP HEARS VODRA ON COMPOUNDING FOR ECONOMY

The October 16th meeting of the Quebec Rubber and Plastics Group held at the Queen's Hotel in Montreal, Quebec, Canada, attracted about 50 members and their guests. Vic Vodra of the Wyandotte Chemicals Corp., Wyandotte, Mich., was the featured speaker of the meeting. He spoke on "Practical Compounding for Economy."

Mr. Vodra first established the premise that with the prices of natural rubber fluctuating and the relaxation of the regulations restricting their uses, compounders have the constant problem of determining when to change from synthetic to natural rubbers and vice versa. His paper was a preview of a soon to be published method which will enable the compounder to know when, from an economic point of view, this point has been reached.

The speaker described the manner in which formulas of varying composition may be developed to meet the same specification at different costs. Stocks with a constant loading of natural rubber were considered as were stocks in which GR-S was the rubber hydrocarbon. He also considered low-temperature GR-S, oil-enriched GR-S and reclaimed rubber in varying proportions with natural rubber and determined their resultant qualities.

Extending Elastomers by Loading

Finally, he spoke of elastomers which were extended by increasing the loading of fillers, resins and softeners. Formula costs were then studied and the exact point determined where shifts from one stock to another would be practical.

It was pointed out that compounding changes, other than the mere substitution of synthetic for natural rubber, were required if the variations in qualities of the final stocks were to be minimized. After these adjustments, many properties of the all-natural stocks improved as the GR-S portion increased. Properties, such as tack, were retained throughout this entire substitution.

Mr. Vodra laid special stress on the "practical" approach and stated that all stocks had been adjusted to make them factory processable.

Washington Installs Officers

The Washington Rubber Group held its Fifth Annual Banquet and installation of officers on October 20 at the Touchdown Club in Washington, D. C. Approximately 125 members and their guests attended the meeting. Harold Wirth (Firestone) acted as toastmaster and introduced Ted Scanlan (Gates Rubber), the retiring president, and Norman Bekkedahl (National Bureau of Standards), the incoming president. Members and guests enjoyed a social hour followed by dinner and dancing after the program.

A new multiple-duty accounting machine manufactured by the National Cash Register Co., incorporates 10 Hycar rubber brackets and mountings in order to reduce machine noise and vibration.

Data on Fluoro-Rubbers

For many years the Minnesota Mining & Manufacturing Co. has been working with fluorocarbons. Some three years ago, in conjunction with the Wright Air Development Center of the U. S. Air Force, special research was launched on so-called fluoro-rubbers. As a result of this research, Minnesota Mining is currently producing on a limited scale a series of rubbery, fluorine-containing polymers. Brief reference to these rubbers appeared in our October issue in the article on "Present and Future Requirements of Rubberlike Materials for a Global Air Force," by E. R. Bartholomew of the Wright Air Development Center. Some additional data was contained in two papers presented by Minnesota Mining personnel at the recent meeting of the American Chemical Society at Atlantic City, N. J.

Although complete information on the new fluoro-rubbers is not yet available, it is now definite that they are polymers and copolymers of 1,1-dihydroperfluoroalkyl acrylates and 1,1-dihydroperfluorobutyl acrylates. All of these fluoro-rubbers exhibit exceptionally good high temperature stability and are practically impervious to attack by ozone, fuels, lubricating oils, hydraulic fluids, etc. These properties recommend them especially for aircraft and automotive applications. Vulcanization of the rubbers is reported to present no special problems, since Minnesota Mining uses standard rubber equipment, vulcanizing the homopolymers with metal oxides. Copolymers, with butadiene for example, lend themselves to the ordinary vulcanizing agents. Some of the copolymers, vulcanized with sulfur and reinforced with carbon black, have given tensile strengths up to 2500 p.s.i.

The major emphasis to date has been placed on polymerized 1, 1-dihydroperfluorobutyl acrylate. Perfluorobutyric acid is prepared electrochemically at Minnesota Mining's pilot plant at Hastings, Minn. This is converted to the methyl or ethyl ester, catalytically reduced to the corresponding alcohol. The alcohol may then be esterified with acrylic acid to yield a monomer which is polymerizable in bulk or in solution. At present, the production cost is relatively high, but the company believes a commercial market can be developed based on the unusual properties exhibited by the various fluoro-rubbers.

A.S.T.M. Issues Year Book

A new edition of the A.S.T.M. Year Book has been issued by the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna. Like previous editions, the Year Book contains a complete list of members, arranged both alphabetically and geographically, as well as members of specific technical committees. General information and data pertaining to the operations of the Society are also included. Copies of the book are available on request from the Society.

Magic Chemical Co., Brockton, Mass., has issued a new, revised catalog which contains complete details about "Magic-Vulc" anti-abrasion and anti-corrosion plastic-rubber coatings.

600,000 Trees Slashed by Reds

According to the United Planting Association of Malaya, terrorists slashed 600,000 rubber trees—costing the industry $6,000,000 in income and capital loss—during 1951. The photograph below shows a typically slashed *hevea* tree. Because of these and other acts of terrorism, estates in Malaya have had to bear the cost of defense measures costing $16,000,000. Planters still live in continual danger and cannot relax security precautions, the association stated. Despite resettlement regrouping, which was said to have resulted in less food for the bandits and more information for the security forces, there was little change during 1951 in emergency conditions as far as planters were concerned.

DPA Announces Expansion Goals

The Defense Production Administration has announced expansion goals for three chemicals. They are for hexamethylenetetramine, pentaerythritol, and octyl alcohols. The goal for hexamethylenetetramine in private plants has been set at an annual capacity of 28,000,000 pounds by January 1, 1955, representing an expansion of 10,000,000 pounds over January 1, 1951, capacity.

The goal for production of pentaerythritol has been set at an annual capacity of 65,000,000 pounds by January 1, 1955, an expansion of 25,000,000 pounds over January 1, 1951, capacity. The goal for the production of octyl alcohols has been set at an annual capacity of 167,000,000 pounds by January 1, 1955, an expansion of 60,000,000 pounds over January 1, 1951, capacity.

Dr. George E. Holbrook, director of the NPA Chemical Division, has estimated that during the four-year period 1951-1955, approximately $5,000,000,000 will be invested by the chemical industry in expansion of production facilities. Dr. Holbrook pointed out that the figure represents total expansion of facilities for the production of chemical products coming under the jurisdiction of the Chemical Division and does not include rubber and other commodities handled by other NPA divisions.

Tire Pricing in Controversy

The controversy between the Office of Price Stabilization and the tire manufacturing industry seems to be heading to a showdown, according to reports from Washington. The method used by the industry to price second-line low-pressure tires is in dispute. OPS officials are preparing to send out another questionnaire in order to complete their information on manufacturing costs for these tires. It is expected that by mid-December, OPS will either drop the matter or ask the Justice Department to bring suit for alleged violation of ceiling prices. Only five firms are now involved in a possible damage suit—Firestone, Goodyear, Armstrong Rubber, Mohawk Rubber and Kelly-Springfield. If a damage complaint is involved, OPS is entitled to seek trebled damages. The Tire Executive Committee of the Rubber Manufacturers Association recently adopted a resolution condemning the OPS view as contrary to the industry's historical practice of pricing replacement tires, and will present that resolution to any court asked to pass on an OPS complaint. When second-line tires were introduced early in 1952, manufacturers priced them under Sections 4 and 5 of the General Ceiling Price Regulation which requires use of the most nearly comparable commodity in an existing category. The manufacturers took as their comparable item their first-line high pressure tire. Early in September, OPS issued a Supplementary Regulation to GCPR fixing ceiling prices for second-line low-pressure tires at 75% of the ceiling for first-line low-pressure tires. This latter regulation had the effect of placing ceilings at a lower level than previously determined manufacturers' prices.

Boston Holds Fall Meeting

The Fall Meeting of the Boston Rubber Group was held on October 17 at the Somerset Hotel in Boston, Mass., with approximately 480 members and guests in attendance. The speakers at the meeting were Dr. Maxwell A. Pollack, chemical consultant, who spoke on "Plasticizers for Elastomers," and Leonard M. Freeman, manager of the works technical group of the B. F. Goodrich Co., who spoke on "Application of Statistical Quality Control in a Rubber Factory." Reports on these two papers will appear in the December issue of RUBBER AGE. John Andrews, chairman of the group, has resigned because of his transfer to England. The by-laws provide that the vice-chairman, Alan W. Bryant (Binney & Smith), shall assume his duties. T. C. Edwards (Acushnet Process), chairman of the Nominating Committee, announced the following slate for the 1953 season: *Vice-Chairman*, W. F. Malcolm (Titanium Pigment) and Frank Tobin (Windram Mfg.); *Secretary-Treasurer*, Edwin D. Covell (Stedfast Rubber) and Tom C. Ashley (T. C. Ashley & Co.). Arthur Ross and William Maguire were nominated for a two-year term on the Executive Committee. E. C. Crocker of the General Latex & Chemical Co. showed a motion picture at the meeting entitled "Stretching Highway Dollars with Rubber Roads."

Hill Named Assistant Manager

Henry A. Hill

National Polychemicals, Inc., Boston, Mass., has announced the appointment of Dr. Henry A. Hill as assistant manager. Dr. Hill will be responsible for all manufacturing and technical activities of the company, according to Edward V. Osberg, general manager. Dr. Hill came to National Polychemicals from the Dewey & Almy Chemical Co. Previously, he had been director of research for the Atlantic Research Associates and vice-president of the National Atlantic Research Corp. Dr. Hill, who received his doctorate in organic chemistry from the Massachusetts Institute of Technology, is a member of the American Chemical Society and the American Association for the Advancement of Science. National Polychemicals, recently organized to manufacture specialty organic chemicals, is building a plant in Wilmington, Mass., for its various projected manufacturing operations, the first of which is expected to be "on stream" early in 1953.

To Direct Far Eastern Purchasing

Rear Admiral Paul L. Mather, U. S. Navy, Ret., has been named to direct Far Eastern purchasing for the Defense Materials Procurement Agency. Admiral Mather will maintain headquarters in Singapore. In his new post, he will have direction of purchasing activities in the Far East for such materials as rubber and tin. DMPA is entrusted with expanding production and supplies of strategic materials in other countries. It has divided the world into four regions and established offices in each to cover potential sources of materials.

W. C. Dillon Co. Relocates

W. C. Dillon & Co., Inc., formerly located in Forest Park, Ill., has moved to new manufacturing and office facilities at 14620 Keswick Street in Van Nuys, Calif. The new plant provides 12,000 square feet on a two-acre site. In the design of the new installation, heavy stress has been laid upon the laboratory where new developments will be pursued. The Dillon concern is composed of W. C. Dillon and his six sons, all of whom are active in company affairs.

Smallholder Replanting Under Way

According to the Natural Rubber Bureau, Washington, D. C., the largest rubber replanting project ever undertaken in the world is now under way in Malaya. The scheme, which calls for the eventual replanting of a major part of Malaya's rubber acreage with improved high-yielding trees, is designed to increase Malayan smallholder rubber production to help meet the predicted future world demand. Since 1900, world consumption of rubber has doubled every ten years. At that rate, the 1960 demand for rubber might well reach 4,000,000 tons, the Bureau estimates. As the initial step in the replanting program, Malaya will replant 500,000 acres of smallholders' rubber by the end of 1959. This immediate work will take care of only the oldest trees; other plans now being drawn up call for additional replanting aid. Under this first plan, smallholders who had old trees felled and the land cleared and ready to plant by October 15, 1952, were to receive cash advances of $40 (U.S.) per acre to pay for replanting. The program is limited to farms of less than 100 acres. The new high-yield rubber seedlings now available for replanting can be expected to at least double the yield per acre. The present yield for smallholder rubber in Malaya is under 400 pounds per acre. The average for high-yielding rubber is about 800 pounds per acre.

Little League Baseball

Little League baseball is big league now, according to a special issue of *Us*, magazine published by the U. S. Rubber Co. Expressly for boys from 9 to 12 years of age, Little League baseball has swept past the big leagues in size, popularity and attendance during the past five years. The 28-page magazine is devoted entirely to the history, organization and growth of Little League baseball and U. S. Rubber's participation in this activity. H. E. Humphreys, Jr., president of the company, states in the publication that Little League baseball is one of the finest things that ever happened to America. It is fine for the boys, he says, because it gives them good clean fun and because it helps them along the road to responsible living and citizenship.

American Resinous Names Agent

American Resinous Chemicals Corp., and the American Polymer Corp., both of Peabody, Mass., have announced the appointment of G. S. Robins & Co. as their representatives in Eastern Missouri, Southern Illinois, Western Tennessee and Arkansas. The Robins company maintains extensive warehouse facilities at their location at 126 Chouteau in St. Louis, Mo. American Polymer has also released two new data sheets covering products manufactured by the company. Technical Data Sheet P-39 concerns itself with "Polyco 497," an alkali-soluble polyvinyl acetate copolymer in water dispersion. Technical Data Sheet P-40, lists properties and specifications of "Polyco 426," an aqueous dispersion of a nitrogen-containing terpolymer.

Tuthill Elected Vice-President

Newton H. Tuthill

At a meeting of the board of directors of the Pequanoc Rubber Co., Butler, N. J., on October 2, Newton H. Tuthill was elected a vice-president. Mr. Tuthill joined Pequanoc Rubber as assistant treasurer in 1947 after a transfer from the parent firm, the American Hard Rubber Co. He was elected secretary-treasurer in 1948 and will continue in this office while assuming the additional duties of vice-president. Mr. Tuthill is a member of the Controllers Institute of America, the National Association of Cost Accountants and the Butler Rosary Club. He is a graduate of Norwich University and the Harvard Graduate Business School.

Huldrum and Irvine Promoted

G. W. Huldrum, Jr., has been appointed sales manager of the Eastern Division of the Shell Chemical Corp., while V. C. Irvine has been named sales manager of the Western Division. Mr. Huldrum succeeds J. G. Frye, who has resigned to take up another post, while Mr. Irvine succeeds Mr. Huldrum. In his new position, Mr. Huldrum will supervise all sales activities east of the Rocky Mountains for Shell Chemical's solvents, resins and plastics, and industrial chemicals. His office will be at 500 Fifth Avenue, New York, N. Y. Mr. Irvine will head sales activities in ammonia and ammonium sulfate, fertilizers, solvents for lacquers and varnishes, plastics and resins, and industrial chemicals west of the Rockies. He will maintain headquarters at 100 Bush St., San Francisco, Calif.

Huber Zeolex 20 Available

Commercial quantities of "Zeolex 20", a new white reinforcing pigment, are now available from the Chemical Division plant of the J. M. Huber Corp., Havre de Grace, Md. Zeolex 20, a calcium zeolite, has wide reinforcing applications in rubber and plastics stocks. As one of the world's largest clay producers, the company's entrance into pigment production is a natural step. With unlimited supplies of kaolin at its disposal from Huber-owned clay mines in Georgia and South Carolina, the company developed the product after four years of research and 12 months of pilot plant testing.

NAMES IN THE NEWS

M. B. BELINE, for the past several years associated with the Washington, D. C., office of the H. K. Porter Co., Inc., has been appointed to the newly-created post of director of national accounts for the Quaker Rubber Corp, a division of the company.

HARRY BOURNE, formerly factory manager at the Waynesville, N. C., plant of the Dayton Rubber Co., has joined the Armstrong-Norwalk Rubber Corp. at Norwalk, Conn., in a similar capacity.

GIOVANNI PORRINI, chief chemist of the Rubber Division of the Eberhard Faber Pencil Co. for many years, has been appointed works manager of Bayshore Industries, Inc., at Elkton, Maryland.

MAURICE H. WHITLOCK, formerly associated with the Applied Development Branch, Research and Development Division of the Office of Synthetic Rubber, Reconstruction Finance Corporation, has accepted a position with the Rocket Fuels Division, Research and Development Department of the Phillips Petroleum Co., McGregor, Texas.

WILLIAM J. BUCKLEE, associated with the Johns-Manville Corp. since 1928, has been named general sales manager of the Celite Division of the company succeeding WILLIAM D. VAN ARNAM, who has retired.

OTTO F. SLONEK, formerly manager of Industrial Chemical Service, Inc., has joined the staff of the Witco Chemical Co. in a technical sales service capacity on chemicals.

DR. EDMUND H. HAMANN, chief chemist in charge of flavor research of Fritzsche Brothers, Inc., was recently honored by the company for his completion of twenty-five years service.

CHARLES E. VOSE, who in September of this year completed his twenty-seventh year of active service as traffic manager for Godfrey L. Cabot, Inc. and the Cabot companies, has retired from active service. He will continue to be associated with Cabot as a traffic consultant.

HARRY C. OLIVER, formerly assistant sales manager of U. S. Tires for the U. S. Rubber Co., has been appointed manager succeeding LAWLER B. REEVES, who has been appointed manager of the newly-formed Oil Marketer Sales Division.

KENNETH L. EDGAR, associated with the Firestone Tire & Rubber Co. since 1940, has been appointed sales manager of Velon products for the Firestone Plastics Co. succeeding ELMER FRENCH, who was formerly vice-president in charge of sales for Firestone Plastics, and who retired on October 1.

DR. GERALD J. LEUCK, formerly technical director of the Glyco Products Co., Inc., has resigned his position with the company to enter the consulting field. He has been appointed special research consultant to Glyco Products.

J. M. LINFORTH, vice-president in charge of manufacturers sales for the Goodyear Tire & Rubber Co., recently received a thirty-year service pin from the company in recognition of his completion of three decades with the company.

L. F. HICKERNELL, chief engineer of the Anaconda Wire & Cable Co., has been appointed chairman of the Technical Program Committee for the 1953 Winter General Meeting of the American Institute of Electrical Engineers which will be held on January 19-23, 1953, at the Hotel Statler in New York City.

OLIVER H. CLAPP has resigned as vice-president and a director of Stein, Hall & Co., Inc.

OSBERT H. PARRINE, formerly manager of time study and methods at the B. F. Goodrich Co., has been named general manager of time study and methods.

WILLFRED W. LUFKIN, JR., previously executive vice-president of Wellington Sears Co., Inc., has been elected president and chief executive officer of the company succeeding RICHARD G. CONANT, who has been named chairman of the board.

JOHN H. SEATON, associated with the B. F. Goodrich Co. since 1927, has been named superintendent of aircraft wheel and brake manufacturing for the company.

FRANK E. DALEY, formerly ceramic engineer for the American Standard Co., has been placed in charge of sales of wollastonite to the ceramics industry by Godfrey L. Cabot, Inc.

DR. RAYMOND H. HARTIGAN, formerly an Administrative Fellow of the Mellon Institute, has been named assistant director of research on the Institute's executive staff.

F. P. MURKEN has been appointed manager of the Industrial Hose Division of the Quaker Rubber Corp., a division of H. K. Porter Co., Inc.

ARNOLD L. WEINER has been elected vice-president in charge of sales for the Upholstery and Automotive Divisions of the Bolta Co., Lawrence, Mass.

CHARLES J. FORD, manager of mechanical goods sales in the Aviation Products Division of the Goodyear Tire & Rubber Co., has been assigned to sales and promotion of rubberized fabric products in addition to his present duties.

GORDON V. MEAD, associated with the Firestone Tire & Rubber Co. since 1929, has been appointed general merchandising manager of the company succeeding Victor D. Kniss, who has resigned.

BENJAMIN MADOW, formerly senior research chemist at the Goodyear Tire & Rubber Co., and holder of a doctorate degree in industrial chemistry, has re-entered college to begin studies leading to a degree in medicine.

CHARLES S. HARDING, for 13 years in charge of development and application of new products for the Shoe Products Division of the Dewey & Almy Chemical Co., has retired under the company's plan.

DR. EGER V. MURPHREE, president of the Standard Oil Development Co., central research and engineering affiliate of the Standard Oil Co. (N.J.), has been named as the 1953 recipient of the Industrial Research Institute Medal.

FRED G. WEIGAND has joined Brown Chemicals as a technical sales service representative with headquarters at 15 Moore St., New York 4, N. Y.

IRVING AUGUST, formerly superintendent of the Denver, Colo., plant of the Worthington Co., has been named assistant to the works manager of the Holyoke, Mass., plant.

DONALD F. MURPHY, associated with the Rohm & Haas Co. since 1930, has been elected a vice-president of the company.

HANS STAUFFER, vice-president and general manager of the Stauffer Chemical Co. since 1941, has been appointed executive vice-president of the company.

J. WILLARD CHILDE, formerly associated with the Continental Rubber Works, has joined the Yale Rubber Manufacturing Co., as sales manager of the Detroit branch.

W. H. SPREEN, formerly manager of the Detroit, Mich. branch office of the Heyden Chemical Corp., has been appointed midwestern district sales manager with headquarters in Chicago.

RICHARD MEEHAN, executive vice-president of H. Muehlstein & Co., Inc., has been named to the board of directors of the National Association of Waste Materials Dealers, Inc., to fill the unexpired portion of the term of the late WILLIAM MCCAULEY.

PETE MURAWSKI, special representative of the DuPont Rubber Chemicals Division, is recuperating from an appendectomy performed on November 7 at the Lutheran Hospital in Brooklyn, N. Y. He will be back on the job shortly.

CHESTER H. PETERSON, associated with the U. S. Rubber Reclaiming Co. since 1950, has been elected executive vice-president of the company.

Controlled particle size
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TEAR RESISTANCE
FLEX LIFE
ABRASION RESISTANCE
CONDUCTIVITY
MODULUS
HARDNESS
TENSILE STRENGTH
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Modern carbon technology, which permits exact control of particle size, makes available Tailor-made Carbons to meet today's diversified compounding problems.

Our carbons cover the fineness range from the super abrasion furnace and channel blacks which provide the maximum in abrasion, tear resistance and tensile strength to the low hysteresis, high rebound, easy processing carbons typified by Furnex.

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FF **STATEX-B**
FEF **STATEX-M**
HMF **STATEX-93**
SRF **FURNEX**

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NEWS IN BRIEF

A new, revised four-page data sheet describing "Flintseal" rubber-asphalt hot-poured joint sealing compound for concrete pavements has been issued by the Flintkote Co. Ask for data sheet I-H 601.

Goodyear has let a contract for the construction of a new $325,000 district office and warehouse building at Charlotte, N. C.

The DuPont Rubber Chemicals Division has issued another in its series of technical reports. BL-248 covers "RPA No. 3 in Oil Extended GR-S Type Copolymers."

U. S. Rubber has issued an interesting new booklet entitled "You and U. S. Rubber," which describes the company, its products, and the place of the company in the community.

The committee of judges of the 1952 American Public Relations Association has selected Goodyear's "Better Roads" campaign as the winner in the Transportation Classification of Awards, and will give the company a special award when they are presented in March, 1953.

Columbian Carbon has added 25 hopper bottom cars of a new design to its rail fleet for the bulk transportation of its "Statex" brand of carbon black.

Bicycle tire production at Goodyear's New Bedford, Mass., plant, recently reached an impressive milestone with the completion of the 15,000,000th unit.

A new direct drive hydraulic converter for extra-heavy duty trucks has been developed by the Twin Disc Clutch Co., Rockford, Ill. The assembly is completely oil actuated and special hot oil-resistant seals made of Hycar are used throughout.

"What You Should Know About Neoprene" is the title of an interesting booklet recently released by the Rubber Chemicals Division of DuPont.

Corrosion-resistant tank liners made of "Agilene" (polyethylene) and "Agilide" (unplasticized polyvinyl chloride) are now being offered by the American Agile Corp., Box 168, Bedford, Ohio.

U. S. Gauge, Sellersville, Penna., is manufacturing sensitive aircraft gauges that indicate absolute manifold pressure which depend on Hycar rubber gaskets for perfect performance.

Stauffer Chemical Co. has issued a revised 112-page edition of their general catalog covering basic chemicals for industry and agriculture.

A technical service report describing the uses and properties of dibutyl phthalate is now available from the Witco Chemical Co., New York, N. Y. Ask for Technical Service Report E-4.

The DuPont Fabrics Division has appointed the Voss Belting & Specialty Co., Chicago, Ill., as the first distributor of "Teflon" coated glass fabric in the form of conveyor belting.

A redesigned package and a change in package contents has been announced by the Wooster Rubber Co. for its Rubbermade Shelf Kushion and Rubbermaid Base Cabinet Shelving products. Formerly packaged in units of three, the new package now holds a single product made visible to the customer through a cellophane window.

Goodrich Chemical has issued another in its series of Hycar Technical Newsletters. Issue No. 10 covers "Low Temperature-Polymerized Hycar 1042".

U. S. Rubber has reported that as of June 30, 1952, it had approximately 19,500 registered holders of common stock, a gain of 3,300 or about 20.4% in the first six months of this year. The gain reflects a two-for-one common stock split and a 50% stock distribution, which had the effect of a three-for-one split, effective last April.

A graphic portrayal of what "Kansas City Offers Industry", is set forth in a new 4-color brochure which has been made available by the Chamber of Commerce of Kansas City, 1030 Baltimore Avenue, Kansas City 6, Mo.

Arco Co., Cleveland, Ohio, has introduced a new latex base wall paint which may be painted directly over damp surfaces. The paint is called "Arcotone Vel-Lure".

A handy "Fork Truck Comparison Chart" is now available from Lewis-Shepard Products, Inc., Watertown, Mass. The new chart lists 27 buying guides.

The Special Products Division of the Phillips Petroleum Co., Bartlesville, Okla., has issued Price List No. 10 covering Phillips 66 hydrocarbons and aliphatic sulfur chemicals.

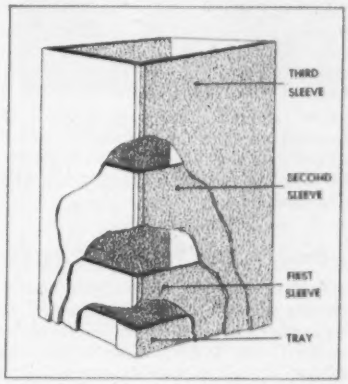
Claud S. Gordon Co., Chicago, Ill., has opened a new manufacturing plant on a 6½-acre site at Richmond, Ill., for the manufacture of their line of thermocouples, pyrometer accessories, specialty instruments, and metallurgical testing machines.

Phillips Chemical has issued a new chart summarizing the new RFC program for simplifying the production and nomenclature of the synthetic polymers and masterbatches produced by RFC.

The Natural Rubber Bureau has released a film on the use of natural rubber powder in asphalt roads. The film is entitled "Stretching Highway Dollars with Rubber Roads."

Gaylord Container for Rubber

Up to 32 bales of synthetic rubber, each weighing 75 pounds, are being combined into a compact unit load by the use of a new corrugated shipping container developed by the Gaylord Container Corp., St. Louis, Mo. Previously, each bale was packaged in a multi-wall bag, and 21 of these bags were arranged so that the entire load could be handled by a lift truck although actually not palletized. The new "package" increases the weight per unit load and adds to its height, thus reducing the floor area per unit. An over-all lower packaging cost results from simplified storage handling plus improved loading and unloading of freight cars.



Cut-away view of Gaylord's rubber box. Note that extra walls are placed at the point of greatest internal pressure.

Gaylord's container is 100% corrugated board and requires no reinforcing tapes or steel strapping and wire that might result in damage to machinery in the users' rubber room. The principle is to use a single base tray held in position by a sleeve. When the base tray is filled with bales of rubber, a second sleeve higher than the first is slipped over the sides. This gives an extra wall to the container and provides space for more bales. A third sleeve is finally added and bales stacked inside to capacity. In this way, the greatest amount of container strength is developed where internal pressure by the contents is greatest. At the bottom, where the pressure of the cold flow rubber is at its maximum, the container has four walls. At the top where pressure is least, a single wall is provided. An ordinary blade type of fork will slip under a filled container, and repeated use of the fork truck presents no problem from the standpoint of good handling methods or injury to the container. Because of its dimensions, it fits into the car with a minimum of work. No manual handling is required to develop the maximum carloading factor, and users report savings of about 20 man-hours in unloading a single car.

Durable Formed Products, Inc., New York, N. Y., have announced the production of the first all-plastic refrigerator food chamber for the P. S. Incorporated Junior Refrigerator. The chambers are made of thin gauge U. S. Rubber "Royalite".

Nantz and Vittone Promoted

B. F. Goodrich Chemical Co. has announced the appointment of Tom B. Nantz as manager of the company's new $5,000,000 vinyl plastic monomer plant at Calvert City, Ky. Anton Vittone, Jr., has been named to succeed Mr. Nantz as plant manager of the Institute, West Va., GR-S plant, operated for the government by Goodrich Chemical. Mr. Vittone was formerly plant engineer at Institute. Mr. Nantz went to work in the B. F. Goodrich laboratories as a chemist shortly after being graduated in 1937 from the University of Kentucky with a B. S. in industrial chemistry. Mr. Vittone was graduated from the University of Washington with a B. S. in chemical engineering and received his M. S. in chemical engineering from the same university in 1939. He joined Goodrich in 1942 as a GR-S shift foreman. Both Mr. Nantz and Mr. Vittone are members of the American Institute of Chemical Engineers and the American Chemical Society.

Dewey & Almy "Flowed-In" Gasket

A new type of gasket which is said to provide an improved seal at lower labor and material costs is now being produced by the Dewey & Almy Chemical Co., Cambridge, Mass., as a replacement for conventional pre-cut cork or rubber gaskets. It can be used in a wide range of manufacturing industries where component parts require gaskets. Called the "flowed-in" gasket, it is applied as a liquid synthetic rubber or resin compound, forced through a nozzle onto a spinning component part and then baked to form a solid rubbery gasket which will not fall off the part. The gasket can be applied either automatically or semi-automatically, depending upon lining equipment used, and in varying types, thicknesses and diameters.

Flexrock Protective Coatings

The Protective Coating Division of the Flexrock Co., Philadelphia 4, Penna., has announced two major changes in protective coatings produced by the firm. The first is the use of vinyl resins formulated with acrylics and the other is the use of rubber resins formulated with acrylics. As a result, it is claimed that these new coatings have greater chemical resistance and greater adhesion to metal, wood, and concrete surfaces. Flexrock recently formed the Protective Coatings Division to handle the new products. The division is headed by John G. Wild, specialist in the field of protective coatings for the past 15 years.

Elected O'Sullivan Chairman

Vincent A. Catozella has been elected chairman of the board of the O'Sullivan Rubber Corp., Winchester, Va., succeeding R. J. Funkhouser. Paul Terretta, executive vice-president of the company, has been given the additional post of treasurer, succeeding P. L. Hockman, who has resigned. H. Douglas Weaver, secretary, has been named to the Executive Committee of the company.

LABOR NOTES

The Wage Stabilization Board has ruled that all rubber companies which follow the wage patterns of the "Big Four" can give their employees a 10c an hour pay increase. A URW spokesman said that the WSB action provides for "self-administering" of the increase by companies that normally grant the same wage increases as "Big Four" firms. Among firms that have signed a 10c increase agreement with the union are: General Tire, Seiberling Rubber, Mansfield Rubber, Mohawk Rubber, American Hard Rubber, RCA Rubber, Ace Rubber Products, Sweet Rubber, Eclat Rubber, Killian Manufacturing, H. Muehlstein, A. Schulman, and the Midwest Rubber Reclaiming Co.

Monsanto Chemical Co. has announced that its Nitro, West Va., plant, which had been closed as a result of being unable to negotiate a new labor contract, has resumed operations with the signing of a new contract.

Employees of the Yale Rubber Manufacturing Co., in an NLRB election on October 9, voted against accepting representation by the United Automobile Workers, AFL.

1st Basic Materials Exposition

An international exposition, first of its kind held anywhere on developments in the field of basic materials including rubber and plastics, will be held at Grand Central Palace in New York City from June 15 to 19, 1953. Simultaneously with the exposition, a series of technical conferences will be conducted to discuss the properties and potentialities of the new materials. More than 15,000 executives concerned with design and development of products are expected to attend from every major manufacturing center in the world. Almost 2,000 experts will be on hand to lead conference discussions and answer questions at exhibits. Top executives of 20 major companies are included in the sponsoring board, among them John R. Hoover, president of the B. F. Goodrich Chemical Co., Thomas M. Bancroft, president of Mt. Vernon-Woodbury Mills, and F. M. Daley, president of the Sponge Rubber Products Co. Clapp & Poliak, Inc. of New York City will manage the exposition and conference.

Fire Damages Rubber Stocks

Three piles of natural rubber in the storage yards of the General Tire & Rubber Co. at Akron, Ohio, were ignited by sparks from a welder's torch on October 13. The company estimated the loss at $50,000. A number of automobiles parked near the rubber piles were ruined in the blaze. Winds blowing away from the plant prevented what might have become a much more serious blaze. As a safety precaution, however, employees were ordered out of the plant. Normally, the rubber would have been stored inside, but there had not been sufficient room indoors to house the rubber. Company officials said that it was the first fire "of any consequence" in the firm's history.

Naugatuck Develops New Synthetic

In a paper delivered before the recent meeting of the Division of Rubber Chemistry of the American Chemical Society at Buffalo, N. Y., it was revealed that the Naugatuck Chemical Division of the U. S. Rubber Co. had developed a new synthetic rubber which holds promise of offering greater tire wear than was thought possible a few years ago. It was reported that the new synthetic, now in pilot plant stage, gives 30 to 50% more abrasion resistance than standard "cold" rubber. It also has good resistance to heat, cracking caused by rapid flexing, and the deteriorating effects of aging in air. The new rubber is made possible by the addition of rosin chemicals to an extra-tough "cold" GR-S. The rosin chemicals are said to make the rubber easier to fabricate into products and improve its end-product qualities. The chemicals are added to the rubber when it is in the latex form. Carbon black may also be added at the same time.

Wins Public Relations Award

National recognition for its outstanding public relations in the field of labor relations was given the Firestone Tire & Rubber Co. in an award recently announced by the American Public Relations Association of Washington, D. C. The award pays tribute to the "development of a company-wide Employee Communication Program to increase interest and understanding among employee families of Firestone operations and policies." Two years ago, Firestone was cited by the American Public Relations Association for its public relations activity in the field of manufacturing. At that time, the company won national recognition for focusing public and employee attention on the part Firestone activities had contributed to a better way of life, economically and socially, in the United States.

Goodyear Neolite in Suede

The Shoe Products Division of the Goodyear Tire & Rubber Co. introduced a new development in the shoe industry at the recent National Shoe Fair in Chicago, Ill.—sueded Neolite. The sueded Neolite, which can be produced in accepted colors, lends itself to all types of shoe construction. Uniform in quality and texture, Neolite suede will not lose its color or matt and can be easily cleaned, according to the company. Also shown at the Fair were shoe products made entirely of Neolite, Neotex-Neolite soles and heels (Neolite with half the weight of leather), and "cellular" Neolite.

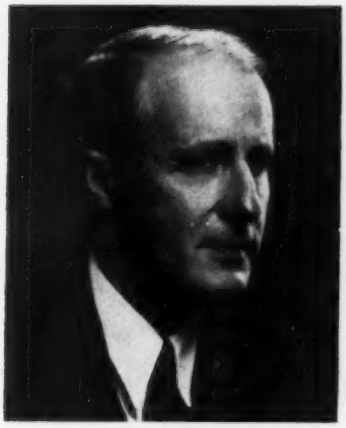
More Certificates of Necessity

The Defense Production Administration has issued a new list of approved Certificates of Necessity for accelerated tax amortization on new or expanded defense facilities. Certificates issued recently include:

Stokes Molded Products, Inc., Yardley, Penna., $1,549,000 for plastic separators for military type batteries.

McNeil Machine & Engineering Co., Summit, Ohio, $113,674 for tire curing presses.

U. S. Rubber Promotes McGavack



John McGavack

Dr. John McGavack has been appointed technical director of the Plantation Division of the U. S. Rubber Co. succeeding Dr. E. M. McColm, who has been transferred to research and development work at the company's General Laboratories in Passaic, N. J. In his new position, Dr. McGavack will direct the Plantation Division's research and development work. He will supervise its technical service on sales of latex and dry rubber grades, and control the technical aspects of latex and rubber processing and latex shipment, storage and handling. Dr. McGavack has been with U. S. Rubber since 1920, and since 1936 has headed the Crude Rubber and Latex Department at the General Laboratories.

Joint Armed Forces Procurement

The Armed Services Textile and Apparel Procurement Agency (ASTAPA), newly-established Army-Navy-Air Force and Marine Corps purchasing organization, began operations on October 1 at 111 East 16th St., New York 3, N. Y. ASTAPA is expected to fill a long-felt need for the creation of a joint armed forces purchasing agency capable of achieving maximum efficiency and economy in the buying of clothing, footwear, textiles and related supplies for use by the four military services both at home and overseas. The activation of ASTAPA does not imply the liquidation of the New York Quartermaster Procurement Agency, which will continue operating for the purchase of certain other products.

General Tire Borrows $30,000,000

General Tire & Rubber Co. has completed arrangements for a $30,000,000 "V"-type loan with 11 of the nation's leading banking houses. Under this method of financing, one or more government departments interested in defense contracts held by General Tire guarantee the loan in part. The loan runs through September, 1953. Company officials said the loan would greatly assist the company and its subsidiary, Aerojet Engineering Corp., in taking an increasingly larger part in the defense program.

Goodyear Abandon-Ship Boat

In keeping abreast with latest developments in air-sea rescue work, the Goodyear Tire & Rubber Co. is producing a 15-person abandon ship boat for the U. S. Navy. Fifteen feet eight inches long and seven feet four inches wide, it has a specially-designed dual wall canopy which offers protection against extremely hot or cold weather. In case of emergency, the inflatable floor can be removed and thrown overboard to assist those in the water. A life-line is attached to the inflatable floor. Measuring six feet by 22 inches by 30 inches in its carrying case, the boat weighs approximately 260 pounds fully equipped with inflation pump, repair kit, four paddles, floatable knife and heaving line. The carrying case contains two sections. The top section holds the boat and the bottom has three accessory containers for storing U. S. Navy survival equipment. Capable of being inflated within 30 seconds by compressed carbon dioxide, it can withstand a drop of 35 feet into the water without damage. Named the "Mark III," 15-person abandon ship boat, it is made of cotton cloth processed with neoprene. Boarding ladders made of nylon with cross pieces covered with rubber are conveniently located at each end of the raft.

Acquires Federal Tire Brand Name

The tire trade name "Federal", one of the oldest in the country, has become the exclusive property of the Tide Water Associated Oil Co., under the terms of a contract signed recently with the U. S. Rubber Co. The agreement also transfers ownership of all Federal tire molds and equipment. Federal tires have a history which dates back to 1909. Tide Water Associated Oil Co. became the exclusive distributor of U. S. Rubber's Federal tires and tubes in January, 1947, and since then has expanded the tire line. Today's complete Federal tire and tube line, handled at all Tide Water Associated Flying-A service stations and outlets, includes the Federal Flying-A Safety-Ride premium tire, the Federal Flying-A Air-Wing low pressure tire, the Federal Classic, the Federal Flying-A Air-Flex, mud and snow tractor tires and commercial tires for buses and trucks.

Amtico On-Grade Flooring Cement

A new waterproof flooring cement has been introduced by the American Biltrite Rubber Co., Trenton, N. J. Called "Amtico On-Grade Cement," it is made for the installation of Amtico Rubber Tile, Amtico Plastex Rubber Flooring, cork and vinyl tile, or to bond linoleum, ceramic and terrazzo floor coverings to wood, steel, composition and non-porous suspended subfloorings, or to concrete or brick at grade level. The new cement is mixed as required from two ingredients, a powder which is sold in a 13-pound container; and a liquid, which is sold in units of one gallon. The two must be mixed together to provide a chemically set flooring cement. A gallon of liquid and 13 pounds of the powder have a spreading capacity of 150 to 180 square feet.

Horsey Named Vice-President

R. E. Horsey

R. E. Horsey, associated with Givaudan-Delawanna, Inc., since 1943, has been named vice-president in charge of sales for the company and its affiliate, the Sindar Corp. This appointment consolidates the sales management of both companies. Mr. Horsey, a graduate of the Case Institute of Technology with a B.S. in chemical engineering, first served as manager of the Industrial Products Division. When, in 1948, the sales functions of Givaudan-Delawanna company were absorbed by Sindar, a newly-formed associate company, Mr. Horsey was appointed sales manager, a position he held until his latest promotion.

Germans Develop New Synthetic

Formerly part of the I. G. Farben combine, the West German chemical works of Bayer, Leverkusen, have developed a new synthetic material which they claim is superior to both natural rubber and buna. Called "Vulcollan", it was shown for the first time at the German Plastics Fair held during October at Bonn. Officials of the works said that "Vulcollan" was produced by a new process developed after years of research work. They claimed it had already proved itself superior to natural rubber and buna for various products including heels, cable insulation and certain types of tires. It had proved up to six times as durable as natural and buna in some cases and could be poured into molds before hardening—a new method in the field of production. They added it was too early yet to speak about production figures and costs.

Ress In New Goodrich Post

B. F. Goodrich Co. has appointed Donald F. Ress as manager of its Chemicals and Pigments Purchasing Department. Mr. Ress attended the University of Akron and Ohio State University. Before joining the Technical Department of the company in 1941, Mr. Ress was a field representative for the Reconstruction Finance Corporation. In 1946, Mr. Ress moved to rubber purchasing and in 1949 went to Singapore as managing director of the Goodrich buying subsidiary there. He remained at that post until this new assignment.

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By ROYCE J. NOBLE, Ph. D.

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A Word About the Author—

Dr. Royce J. Noble is a well-known consulting chemical engineer and an outstanding expert on latex. He has been intimately associated with latex technology for the past 30 years and has served with one of the leading suppliers of latex compounds and compositions in a technical and executive capacity. During World War II he was associated with the Chemical Warfare Service as a Colonel engaged in both rubber and latex problems. He is eminently qualified as the author of this comprehensive text book on latex and its applications.

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Electrical Anti-Skid Device

Speaking before the recent National Transportation Meeting sponsored by the Society of Automotive Engineers at Pittsburgh, Penna., A. C. Gunsaulus, manager of development activities for the Wheel and Brake Division of the Goodyear Aircraft Corp., disclosed that a braking principle used on airplanes has been found suitable for over-the-road vehicles. Mr. Gunsaulus described tests conducted by the Goodyear Tire & Rubber Co., parent company of Goodyear Aircraft, which showed that an electrical anti-skid device developed by company engineers prevented pedal pressure from locking brakes, thus keeping tires rolling instead of sliding. By controlling the brake pressure, the electrical unit produces a "stuttering" rotation of the vehicle wheel. The stuttering effect is caused by a sensing feature which neutralizes excessive braking force by alternately releasing and re-applying the pressure controlling the gripping force of the brake drum lining. Although mechanical anti-skid units are not new, the Goodyear device is believed to be the first equipped with an all-electric sensing unit for motor vehicles.

Neville Plant in Production

Pittsburgh Coke & Chemical Co. has begun production in its new plasticizer plant at Neville Island, six miles down the Ohio River from downtown Pittsburgh. The new plant is the most recently completed unit in the firm's current $20,000,000 expansion program. The new plant will boost the company's plasticizer production to more than 1,000,000 pounds a month. The company's Plasticizer Division markets more than a dozen plasticizers. Typical of Pittsburgh Coke's closely integrated operations is the fact that molten phthalic anhydride, a basic ingredient of many plasticizers, is piped directly to the new plant from a nearby phthalic plant. This simplifies production and helps to cut production costs.

Seiberling Votes Stock Increase

Stockholders of the Seiberling Rubber Co., at a recent special meeting in Akron, Ohio, approved an increase in the authorized common stock from 500,000 to 1,000,000 common shares. The increase is part of a plan, announced earlier, to issue $3,750,000 in convertible debentures. J. P. Seiberling, president of the company, told stockholders that about three-fourths of the company's preferred stockholders had already given consent to the new debt. Proceeds of the debenture sale will be used to pay off a $1,200,000 insurance company loan, with the remainder added to working capital after finance charges are paid.

ASTAPA to Purchase Footwear

The Armed Services Textile and Apparel Procurement Agency (ASTAPA), formed recently in New York City, has published an initial listing of items it will purchase for all branches of the Armed Forces. The initial listing includes footwear, shoe findings and soling materials. Further information may be secured from the agency at 111 East 16th Street, New York 3, N. Y.

VINYL SPECIALTIES

A new sprinkler hose made of Vinylite plastic has been introduced by the A. M. Andrews Co., Inc., Portland, Ore. The new sprinkler consists of a double tube with pinpoint holes staggered along the length of each tube for even water coverage.

Billfolds, styled for women by Lilly Dache, are being made of Vinylite sheeting embossed with smart bead and grosgrain textures and vivid new colors by Aristocrat Leather Products, Inc., New York, N. Y.

An all-purpose pocket for ring binders is being fabricated of Vinylite film by Renick Boggs & Co., Chicago, Ill. The "Binder Zip-Kit" is equipped with a slide fastener which makes the contents easy to get at.

Christmas tree and gift ornaments are being molded of Vinylite plastic rigid sheet in three dimensions. Colorfully printed, "Klip-A-Part" Christmas ornaments are produced by the Borkland Manufacturing Co., Marion, Ind.

A new safety-red hunting jacket with a transparent hunting license pocket in back is being made of Vinylite plastic by the Seal-Dri Sportswear Co., Rockford, Ill.

A new play pool made from Koroseal and built with a circular tube which can be rigidly inflated so that children can sit on the sides, has been announced by the Urb Plastics Corp., New York, N. Y.

A colorful new art toy which has hundreds of bright, flat stick-on designs made of Vinylite plastic, has been developed by Colorforms, New York, N. Y.

Undesirable seat squeaking noises often found in automobiles are eliminated in the Ford Motor Company's new line by coating seat cushion tension wires with a Geon vinyl plastic paste supplied by Houghton Laboratories, Inc., Olean, N. Y.

Thiokol Gets Army Contract

The Ordnance Ammunition Center, United States Army has negotiated a contract with Thiokol Corp. to act as technical consultants for the reactivation of the Longhorn Ordnance Works, Karnack, Texas. This reactivation involves the rehabilitation of some of the existing facilities and the erection of numerous other buildings, and the installation of production equipment, all for the purpose of manufacturing solid propellants. These propellants are the outcome of the research and development work of the Redstone Division at Huntsville, Alabama. While the construction of this plant will be the responsibility of the Corps of Engineers, Thiokol will be the technical consultants for Army Ordnance and will be responsible for the procurement of equipment and supervision of the installation. Arrangements for operation will not be made until the plant is near completion, which is expected to be sometime in 1954.

Press and Gauge Wheel Tire

Goodyear Tire & Rubber Co. has announced the development of a special tire for farm planting and tillage implements. Termed an agricultural press and gauge wheel tire, the new unit is made in two types. One is known as the press wheel, for corn and cotton planters, while the other is the gauge wheel tire for regulating penetration depth of farm tillage tools. Both types are said to have distinctive advantages over the conventional steel wheel which has been standard equipment on these implements. The superior ability of the new press wheel to compact the earth both above and around the seed hastens germination. The tire also has great flexibility, enabling it to shed dirt and mud which clings to steel wheels. The new tire has no air pressure but is, at the same time, semi-pneumatic. Small vents at the bottom of the casing force air in and out, permitting the tire to "breathe" as it rolls. The tire is not subject to punctures and requires no service.

New Assignments at Goodrich

William L. Smith, Earl F. Miller, and Almont E. Williams have been named in connection with new assignments in the Industrial Products Manufacturing Division of the B. F. Goodrich Co. Mr. Smith has been appointed technical director of industrial products manufacturing. His new responsibilities will be to integrate the technical activities of all industrial products operations. He has been associated with the company since 1917. Mr. Miller succeeds Mr. Smith as technical superintendent of the Akron Industrial Products Division. He came to Goodrich in 1935. Mr. Williams has been named technical manager of hose. He came to the company in 1946. His most recent job was as technical manager of industrial products.

New Naugatuck Anti-Oxidant

Naugatuck Chemical Division of the U. S. Rubber Co. has announced the development of "Octamine," a new anti-oxidant specifically developed for light-colored rubber stocks. The new product is said to give excellent protection against heat, oxygen, and flexing fatigue—with a minimum of discoloration and staining. Octamine is a granular, waxlike solid that is easy to handle and disperses readily. Since it is a true secondary amine, it functions equally well with or without carbon blacks, Naugatuck Chemical states. It has good storage stability, requires no handling precautions, is non-blooming, and has no appreciable effect on rate of cure.

Loomis Talc Names Whittaker

W. H. Loomis Talc Corp., Gouverneur, N. Y., has announced that its fibrous talc, mined in northwestern New York State, is being distributed by Whittaker, Clark & Daniels, Inc., New York, N. Y., for all industries except the ceramic trade in Massachusetts, Rhode Island, Connecticut, New Jersey and southeastern New York. Distribution for the ceramic industry in this territory is handled by Donald Hager, Zanesville, Ohio.

Heads Colloid Chemistry Division

Dr. Desiree S. Le Beau

Dr. Desiree S. Le Beau, director of research of the Midwest Rubber Reclaiming Co., East St. Louis, Ill., has been elected chairman of the Division of Colloid Chemistry of the American Chemical Society for the 1953 season. Dr. Le Beau also held this post in 1949, and is the only woman ever to head the division. This year, she is chairman of the society's St. Louis Section. A native of Poland and a naturalized American citizen, Dr. Le Beau was educated in Austria at the University of Vienna and the University of Graz, where she received her Ph. D. degree in 1931. For the next year she was professor of science and chemistry at an Austrian junior college. From 1932 to 1935 she was a research chemist for the Austro-American Rubber Works, Ltd., in Vienna. After a year as a consultant to the Societe de Progress Techniques in Paris, she came to the United States as a chemist for the Dewey & Almy Chemical Co. In 1940, Dr. Le Beau was appointed a research associate at the Massachusetts Institute of Technology, where she remained until she assumed her present post in 1945.

DuPont-ICI Case Hits Snag

The Court of Appeal, Great Britain's second highest tribunal, has served notice that United States courts are not to interfere with British firms operating outside the U. S. The U. S. District Court in New York last July ordered the British company, Imperial Chemical Industries, Ltd., to reassign a number of nylon patents handed to them in 1947 by E. I. du Pont de Nemours & Co., Inc. ICI already had licensed the patents to British Nylon Spinners (BNS), a British firm. In August, BNS obtained a court injunction restraining ICI from obeying the U. S. court order. In turning down the ICI appeal against this injunction, the British appeal court ruled that U. S. courts are not entitled to interfere with ICI's rights.

The Compressed Air and Gas Institute has been presented with the 1952 Award of Merit by the American Trade Association Executives of Washington, D. C.

Offers to Buy Crosley Stock

William O'Neil, president of the General Tire & Rubber Co., has confirmed that his company's board of directors have authorized an offer of purchase for the outstanding common stock of Crosley Motors, Inc. of Cincinnati, Ohio. Under the plan, which has been filed with the Securities and Exchange Commission, General Tire offered Crosley stockholders $1.50 per share of common stock in cash, or one share of General Tire common stock for each 21 shares of Crosley common stock tendered. Crosley stockholders were provided an opportunity to tender their stock partly for cash and partly for General Tire common, with the offer open for acceptance through November 10, 1952. Mr. O'Neil pointed out that the offer was conditioned upon the acceptance by no less than 185,251 shares of Crosley common. If more shares than the minimum were offered, General Tire reserved the right to decline the purchase of the excess, and to purchase the 185,251 shares first tendered. If less shares than the minimum were tendered, General Tire reserved the right to purchase these shares providing it exercised this option on or before November 10. At the time of the offer, Crosley had 569,254 shares of common stock. General Tire previously acquired 317,077 shares, or approximately 56%, under a previous agreement.

Phillips Announces "Philblack E"

Phillips Chemical Co., Akron, Ohio, has announced a new super-abrasion furnace black (SAF), "Philblack E". According to the company, cold rubber tire treads made with the new black beat all existing records for mileage—35 to 42% better than HAF black in actual tests on passenger cars under severe road conditions. In natural rubber truck tire treads, Philblack E proved to be 12 to 24% better than EPC black, the company states. The new black may be used in industrial belts and places where "super" performance is required. Philblack E is now in commercial production and available in truckload and carload quantities.

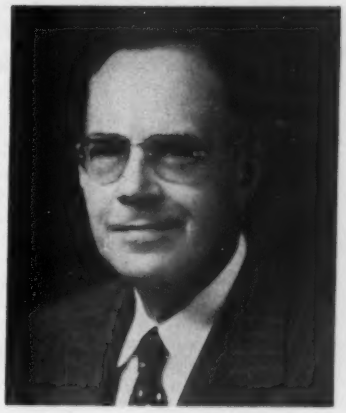
Vicklund Named Sales Manager

R. E. Vicklund, associated with the Sindar Corp., New York, N. Y., since 1950, has been appointed manager of sales and development for the company. Mr. Vicklund, a graduate of Michigan State College of Mining and Technology with a B.S. degree in chemical engineering, joined Sindar as a technical representative. Immediately prior to this appointment, he was chief of the Fungus Control Section of the Engineer Research and Development Laboratories, where he supervised the development and research program on the deterioration and preservation of rubber, plastics, textiles, paints and other materials.

Named Chemical Division Director

Thomas C. Keeling, Jr., formerly deputy director of the Chemical Division of the National Production Authority, has been appointed director of the division.

Elected Thermoid Vice-President



T. J. Ellis

T. J. (Tom) Ellis, formerly factory superintendent of the Rubber Division of the Thermoid Co., Trenton, N. J., has been elected a vice-president of the company. In his new capacity, he will direct rubber manufacturing at all of the company's plants. Mr. Ellis has been associated with the rubber industry since 1925, when he joined the Firestone Industrial Products Co. In 1940, Mr. Ellis and Dr. C. Park developed a bullet-sealing gas tank which was officially approved by the Air Force and was widely used by allied aircraft during World War II. Mr. Ellis directed the setting up of eleven plants throughout the United States which manufactured the bullet-sealing tank during the war. In 1945, he was ordered by doctors to take a rest and moved to Orlando, Fla., where he established a rubber products wholesale distributorship. In 1949, his health restored, Mr. Ellis re-entered the rubber manufacturing industry by joining Thermoid as factory superintendent. He retains an interest in the Florida distributorship.

"Super Transport" Truck Tire

A new truck tire that is said to have delivered up to 50% more mileage in tests and actual fleet operations has been introduced by the Firestone Tire & Rubber Co. The new "Super Transport" truck tire has an extra thick base tread which will assure truck operators of thousands of extra miles of service, the company states. The tread design of five continuous ribs practically eliminates cupping and wiping, and the contour of the tire is flatter and wider to provide maximum driving traction, better stopping and longer wear. Other features incorporated in the new tire, according to the company, include a reinforced, stepped-down shoulder treatment for greater strength and cooler running; a heavier, stronger, wider bead with extra chafers for greater stability on the rim, and a new body made of super gum-dipped, tension-dried cord that prevents growth and cracking.

R. S. Aries and Associates is establishing an annual award for the first and second best books in the field of economics of the chemical process industries.

FINANCIAL NEWS

Boston Woven Hose & Rubber Co.

Year Ended August 31: Net income of $636,159, which is equal to $6.89 a common share, compared with $1,211,454, or $13.66 a share, in the 1951 fiscal year. Net sales in the year ended August 31, 1952, amounted to $20,684,335, against the record sales of $25,769,105 reached in the year ended August 31, 1951. At the close of the 1952 fiscal year, total current assets amounted to $6,446,282, while at the end of the 1951 fiscal year total current assets were $9,171,211. As of August 31, 1952, total current liabilities were $1,935,236, and as of August 31, 1951, total current liabilities were $3,546,826.

Monsanto Chemical Co.

Nine Months to September 30: Net income of $16,080,360, which is equal to $2.97 a common share, compared with $16,687,188, or $3.34 a share, in the first nine months of the previous year. Sales for the first nine months of 1952 totaled $189,290,342, against $207,012,340 for the nine months ended September 30, 1951.

Hewitt-Robins Inc.

Nine Months to September 30: Net income of $668,377, which is equal to $2.34 a share, contrasted with $770,867, or $2.77 a share, in the first nine months of the preceding year. Net sales in the nine months ended September 30, 1952, totaled $27,583,166, against $26,254,814 in the first nine months of the preceding year.

Brunswick-Balke-Collender Co.

Nine Months to September 30: Net profit of $420,767, which is equal to 73c a common share on net sales of $20,056,649, compared with $735,496, or $1.43 a share, on sales of $18,195,854 in the first nine months of the preceding year.

Sheller Manufacturing Corp.

Nine Months to September 30: net profit of $1,642,367, which is equal to $1.72 a share on sales of $31,855,527, compared with $2,412,955, or $2.53 a share, on sales of 33,088,537 in the nine months ended September 30, 1951.

Interchemical Corp.

Nine Months to September 30: Net profit of $1,506,311, which is equal to $1.88 a common share on net sales of $64,206,886, compared with $1,877,454, or $2.44 a share, on sales of $66,951,013 in the corresponding nine months of 1951.

Allen Industries, Inc.

Nine Months to September 30: Net income of $643,541, which is equal to $1.15 a share, compared with $774,766, or $1.39 a share, in the first nine months of the preceding year.

American Cyanamid Co.

Nine Months to September 30: Consolidated net income of $16,932,000, which is equal to $1.95 a common share, contrasted with $30,231,000, or $3.51 a common share, in the first nine months of the preceding year. Net sales of the company and its wholly-owned subsidiaries in the first nine months of 1952 totaled $271,734,000, against $296,630,000 for the first nine months of 1951. The common shares outstanding at September 30, 1952 reflect the stock dividend of one share for each share of such stock outstanding on June 23, 1952, which was paid July 16, 1952.

U. S. Rubber Co.

Nine Months to September 30: Net income of $18,912,141, which is equal to $2.83 a common share, compared with $22,428,878, or $3.51 a common share, in the first nine months of 1951. Net sales in the first nine months of 1952 amounted to $648,744,964, compared with $632,700,279 in the 1951 period. Sales for the first nine months of this year established a new high for the company.

Phillips Petroleum Co.

Nine Months to September 30: Net profit of $56,292,149, which is equal to $3.89 per share, compared with $9,751,662, or $3.74 a share, for the same period of 1951. Sales volume of all finished liquid products sold by the company during the first nine months of 1952 was 24% higher than for the similar period of the previous

Johns-Manville Corp.

Nine Months to September 30: Net income of $18,122,613, which is equal to $5.72 a common share, compared with $19,294,927, or $6.10 a share, in the first nine months of the preceding year. Sales in the 1952 period amounted to $179,228,524, against $178,371,950 in the corresponding period last year.

Circle Wire & Cable Corp.

Nine Months to September 30: Net income of $1,644,135, which is equal to $2.19 a common share, compared with $1,535,181, or $2.05 a share, in the first nine months of 1951. Net sales in the first nine months of of 1952 totaled $16,570,771, against $13,230,425 in the first nine months of the preceding year.

Pantasote Company

First Half: Net loss of $79,003, contrasted with a net income of $96,598, or 16c a common share, in the first half of the previous year. Sales in the first half of 1952 totaled $2,753,687, against $3,246,271 in the first half of 1951.

Named Assistant to President

Albert E. Sidnell

Albert E. Sidnell, formerly associated with the Seiberling Latex Products Co. of Barberton, Ohio, has been appointed to the newly-created post of assistant to the president of the Buxbaum Co., Canton, Ohio. Mr. Sidnell's entire business career has been in the rubber manufacturing and processing industry. He had been associated with Seiberling Latex Products for twenty-two years, rising to the position of vice-president and factory manager. He was also a director of the company. Mr. Sidnell has been active in the Akron Rubber Group which he served as vice-chairman in 1944 and chairman in 1945. A graduate of Akron University, he holds a B.S. degree in physics and chemistry and has had special training in rubber chemistry. Mr. Sidnell is a member of the American Chemical Society.

McNeil Machine & Engineering Co.

Nine Months to September 30: Net profit of $1,152,019, which is equal to $2.30 a share, compared with $960,066, or $1.92 a share, in the first nine months of the previous year. Sales in the first nine months of 1952 amounted to $14,915,286, against $12,161,147 in the first nine months of 1951.

American Zinc-Lead-Smelting Co.

Nine Months to September 30: Net profit of $2,281,349, which is equal to $3.01 a common share on net operating revenues of $62,344,612, compared with $2,321,722, or $3.07 a share, on revenues of $58,154,024 in the first nine months of 1952.

National Automotive Fibres, Inc.

Nine Months to September 30: Net profit of $1,402,272, which is equal to $1.41 a share on net sales of $51,178,790, contrasted with $3,153,598, or $3.16 a share, in the first nine months of 1951.

Flintkote Company

January 1 to October 4: Net income of $3,680,294, which is equal to $2.71 a common share, compared with $4,455,856, or $3.33 a common share, for the same period of 1951.

LEADING SUPPLIERS TO THE RUBBER, PLASTICS AND ALLIED INDUSTRIES ·

NEW RUBBER PRODUCTS

Sea Net "Super Frog Feet"

Sea Net Manufacturing Co., Los Angeles, Calif., has introduced a new item in the water flipper line, "Super Frog Feet." Made of pure gum rubber in a marine blue color, the new flippers are one inch longer than the "Frog Feet" or "Bull

Frog Feet" also manufactured by the company. Super Frog Feet feature a new, non-slip adjustable strap arrangement. Another feature is an extra-large, roomy foot pocket. The flippers are interchangeable and each may be used for either foot, the company says.

So-Lo Marx "Blizzer Boot"

So-Lo Marx Rubber Co., Loveland, Ohio, has announced the latest addition to the "totes" line of pure latex rubber footwear. The new item is called "Blizzer Boot" totes and is said to be the lightest weight children's boot on the market. Soles of the new boots have been triple re-enforced for extra-long wear, while the inherent qualities of the rubber make them warm without added bulk and weight. In a choice of red or amber, the new boot has popular styling with a western cut top. As with the entire "totes" line, the new boots fold to handkerchief size to carry in pocket or school bag.

Vinyl Floating Bathtub Toys

Sun Rubber Co., Barberton, Ohio, has introduced a new line of vinyl floating bathtub toys modeled after Walt Disney characters. The "Donald Duck Soap Boat" is 6¾ inches long, 5¼ inches high and 5

inches wide. It quacks, gurgles and floats and doubles as a soap dish. Another item in the line, "Cleo the Fish," is 7½ inches long and 5 inches high. Both are colorfully decorated.

Introduces New Electrical Tapes

A new and complete line of electrical tapes has been introduced by Ideal Electrical Industries, Inc., 2027 Park Avenue, Sycamore, Ill. These include a four-coated, ravel-free friction tape, a quick fusing high-dielectric rubber tape, and a two-in-one plastic tape. The new Ideal Plastic Electrical Tape provides both insulation and protection against weather and mechanical abuse. The strong vinyl plastic body has a dielectric strength of over 8,000 volts. It is highly-resistant to acids, alkalies, corrosive salts, water, oils, greases and alcohols. It is practically impervious to weather and retains its tackiness well at low temperatures, the company states. The new plastic tape also makes an excellent insulating medium for electrical equipment. The minimum thickness (.007) of this tape, plus its two-way stretch lets it fit snugly to irregular shapes and surfaces. Both tape and adhesive are free of corrosive substances.

American Anode Folding Bucket

American Anode, a division of the B. F. Goodrich Co., has introduced the "Pocket Pond," a new folding bucket designed for campers, gardeners, etc. This latex-dipped

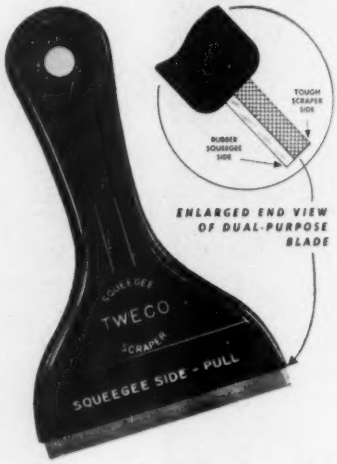
bucket holds a gallon and a half of water, and is light enough for a youngster to carry easily. It won't rot, is easy to keep clean and sanitary, and folds small enough to be carried in the hand.

Gold Seal Rubber Tile

A new line of rubber tile flooring suitable for commercial and institutional installation has been introduced by Congoleum-Nairn Inc., Kearny, N. J. Developed in the company's laboratories, "Gold Seal Rubber Tile" has a smooth, polished surface. It is resistant to alkali, cleaning agents and light and will not bleed, according to the company. The color and design extend entirely through the thickness of the tile. It is resistant to indentation. Gold Seal Rubber Tile is available in tiles 6 by 6, 9 by 9, 12 by 12 and 18 by 27 inches. There are 20 patterns in the ⅛-inch thick tiles, ten of which are also available in 3/32-inch thick tiles.

Tweco Squeegee-Scraper

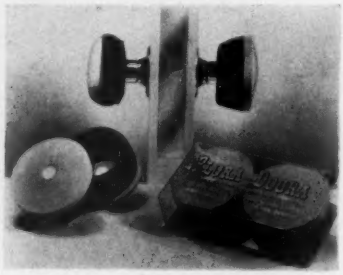
Tweco Products Co., Wichita, Kansas, has introduced a new dual purpose tool designed to keep automobile windshields, home and office windows, etc., clean. The unit has one hard canvas base bakelite scraping edge and one soft rubber squeegee



edge. The hard edge will remove ice, sleet, snow, bugs and mud, while the soft edge removes fog, frost, steam, water and splatter. Three full inches of both scraping edge and squeegee are provided. The rubber blade is securely bonded to the scraping edge, while the handle is molded from a tough plastic.

"Flora-Doora" Foam Door Knob

Romart, Chicago, Ill., has announced a new fluourescent door knob cover made of foam rubber. Called "Flora-Doora", the new product has a phosphorescent neoprene center which appears white in daylight but at night glows a brilliant blue for six to eight hours. Flora-Doora slips on over the regular door knob where its protective cushion silences door-against-wall



slamming. The soft foam cushion insulates the hand and prevents static electrical shock. The new door knob cover is said to be ideal for the nursery to protect little ones from door bumps and to guide them safely in the dark. All Flora-Dooras have jet black rims while the faces are available in ten different pastel shades. They may be washed in warm soap suds to restore freshness.

Graduated cylinders, fabricated throughout of polyethylene, are now furnished from stock by the American Agile Corp., Bedford, Ohio.

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LOS ANGELES NEWS

As reported in the October issue of RUBBER AGE, George M. Konkle of the Dow Chemical Co. addressed the technical session of the October 7th meeting of the Los Angeles Group. Mr. Konkle spoke on "Recent Developments in Silastic." In his talk, the speaker noted that "Silastic," the Dow Corning silicone rubber, has undergone a number of improvements since its introduction to industry in 1945.

The major steps in this improvement are increased low temperature flexibility made possible by a change in the silicone polymer, improved compression set through the use of mercury containing additives, increased elongation and tear resistance, improved electrical properties, and reduced water absorption. Recent developments include low set characteristics without the use of mercury additives and coating pastes of increased toughness and temperature stability.

Heretofore, the speaker stated, it was not possible to combine all of these improvements in a single compound. However, the latest development in Silastic comes close to reaching that ideal. This is offered as two new stocks: Silastic 50 and Silastic 80. These two materials have the Shore hardness indicated by their numbers and can be blended to make compounds of intermediate hardness. They have a combination of desirable properties such as good tensile strength and elongation, low compression set, excellent electrical properties and low water absorption. As an additional feature they contain no toxic materials, such as mercury, which were an objectional feature in other low set silicone rubbers. They are furnished in neutral color which can be pigmented to give any desired color.

These developments show that silicone rubber, although still a new material, has undergone a number of improvements which have greatly increased its usefulness and versatility, he concluded.

The Los Angeles Rubber Group enjoyed its first fall golf tournament on September 26 at the Inglewood Country Club with approximately 45 members and their guests attending. Dinner was served and prizes awarded following the tournament. The following members won prizes: *Blind Bogey,* Randy White (Arrowhead Rubber); *Low Net,* Al Federico (C. P. Hall); *Low Gross,* Miles Reinke (Reinke & Amende); *Closest to Pin,* C. Froude (Arrowhead Rubber); *Low Putt,* Wilbur Johnson (DuPont); *Long Putt,* Paul Karres (Rubber Teck); *Blind Hole,* J. Locke (American Mineral Spirits); *Long Drive,* R. Hill (Para Plate & Plastics).

Dr. A. R. Kemp has resigned his vice-presidency with Narmco Resins & Coatings and a directorship of Narmco, Inc., to return to consulting work.

The technical session of the November 5th meeting of the Los Angeles Rubber Group was to have been addressed by Dr. B. S. Garvey, Jr., director of the Rubber Sales Service Laboratory of Sharples Chemicals Inc. Dr. Garvey was to have spoken on "Accelerator Compounding." A report on his paper will appear in the December issue of RUBBER AGE.

Firestone has reported that its Aircraft Fuel Cell Division at Los Angeles is operating at capacity in turning out more than 200 different sizes and shapes of rubber gas and oil tanks for 30 types of Air Force and Navy Aircraft. The division produced more than 100,000 fuel cells for military aircraft during World War II.

Anaconda UHF Transmission Line

A new "all-weather" UHF transmission line of unique construction has been developed by the Anaconda Wire & Cable Co. and the RCA Service Co., Inc., for the benefit of the entire television industry. Known as the "Anaconda ATV-270," the line serves as lead-in from roof-top to receiver. Its design characteristics include a high-strength Copperweld conductor surrounded by polyethylene spiral thread which acts as a centering medium, allowing the conductor to float within its individual polyethylene tube. Because dimensioning and spacing of conductors is all-important, the polyethylene tube is accurately extruded over Copperweld conductors and polyethylene spiral centering thread. The unique inner construction of the outer jacket allows the twin tubes to literally "float in air." A brown polyethylene jacket assures better protection against weather, greater resistance to abrasion, and greater protection against mechanical damage.

Rip-Proof Conveyor Belting

A new type of conveyor belt that is virtually rip-proof has been announced by the New York Belting & Packing Co., Passaic, N. J. It is designed particularly for use where conveyor belts may be subject to severe ripping or tearing action by foreign objects, such as in coal mining and handling, quarry work, and mining of metallic ores. The outstanding feature of these belts is the special carcass which has multiple strands of high tensile steel wires imbedded at three-foot intervals. Even in the rare instances where a foreign object punctures the belt, the tearing is limited by the unusual construction to a maximum of about three feet lengthwise, the company states. The new product is said to be particularly suitable where conveyor belts are subject to tears and punctures as well as abrasive action. Successful use is now being made in foundries where "shake-out" belts are subject to damage from very hot, sharp pieces of metal.

Aetna-Standard Promotes Thurman

A. L. Thurman

Aetna-Standard Engineering Co., Pittsburgh, Penna., has announced the appointment of A. L. Thurman as manager of the Plastics and Rubber Machinery Division. Mr. Thurman was formerly assistant to the vice-president, with offices in Ellwood City, Penna. In his new capacity he will be located at the company's Warren, Ohio, plant. He has been associated with Aetna-Standard since 1945 and was formerly a steel application engineer for General Electric. He holds degrees in both mechanical and electrical engineering from Oklahoma A. & M. Aetna-Standard entered the rubber and plastics machinery business approximately two years ago when they appointed Hale & Kullgren, Inc. of Akron, Ohio, as their engineers and sales representatives in that field. Earlier this year, they supplemented their business by purchasing the Rubber and Plastics Machinery Division of the National-Erie Corp., Erie, Penna.

New Belt Facilities Opened

Top management of Hewitt-Robins Inc. joined with employees and public officials recently to dedicate the new $1,000,000 addition to the company's conveyor belt plant in Buffalo, N. Y. The program consisted of speeches, the unveiling of a plaque, a tour of the plant and refreshments. The new facilities will increase the company's belt production capacity by 41%, and will make the plant one of the largest and most modern in the world. New equipment includes a press costing $220,000 which will make belts up to 72 inches wide compared with the previous limit of 60 inches.

Named Whittaker Representative

Whittaker, Clark & Daniels, Inc., New York, N. Y., has appointed D. R. Leiser, vice-president of Harry Holland & Son, as company representative in Michigan. He succeeds R. G. Smith, who has been named an executive salesman in New York City to assist W. W. Roff, Whittaker vice-president. Mr. Leiser is a graduate of the University of Wisconsin. He has been manager of the Detroit, Mich., office of Harry Holland & Son since July, 1948.

FORMS FOR TODAY'S WOMAN

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FORMS	MOLDS	DIES	MACHINERY
LATEX - DIPPING	STEEL AND ALUMINUM	PLASTIC - INJECTION	SPECIAL - AUTOMATIC

Hiel Suit Settled for $250,000

The $1,000,000 suit brought by Mrs. Eleanor Tyrrell Hiel against her brother James L. Tyrrell as an outgrowth of a family interest in the Killian Manufacturing Co., has been settled for $250,000. Both Mrs. Hiel and her brother had inherited stock in the business. Mr. Tyrrell, along with Charles E. Jenkins and Maurice Gusman, obtained control of Killian and of L. E. Shunk Latex Products, Inc., as well. The three men organized the Killashun Sales Division, a partnership which sold the output of both factories. Both the manufacturing and sales ends of the business were sold in 1946 to the National Hygienic Products Corp., under an agreement by which the price was to be $8,000,000. Mrs. Hiel's suit charged that as a stockholder she was entitled to a place in the sales partnership. She said her brother handled her stock as trustee, and eventually sold it with her permission. She further claimed that the buying company later cut the amount to be paid to $2,400,000, and that she had no part in this and, in fact, did not understand the transaction. Mrs. Hiel said this cost her $265,000, and that she lost another $700,000 by not being made a partner in the sales organization. It was understood that Mrs. Hiel will receive the $250,000 settlement over the years as National Hygienic makes the payments it owes under the purchase agreement.

Doubling Marvinol Capacity

Naugatuck Chemical Division of the U. S. Rubber Co. has announced that it is doubling the production capacity of its Marvinol vinyl resin plant in Painesville, Ohio. The expanded program, which is expected to be completed by June, 1953, will lift production to more than 50,000,000 pounds annually. In addition to expanding its resin capacity, Naugatuck Chemical has been conducting an intensive research and development program aimed at new, more efficient types of vinyl resin for the plastics industry. Production facilities for these resins are being included in the Painesville expansion program. Additional resins, such as new dispersion and dry blending resins, are now in the experimental stage and will be introduced in the near future. Naugatuck Chemical has also pioneered in the extrusion of tough, transparent vinyl film in thicknesses of one-thousandth of an inch or less which is expected to open up extensive markets in the packaging field. Several new compounds are now being developed specifically for film extrusion.

Plans Wire and Cable Symposium

The Signal Corps Engineering Laboratories, Fort Monmouth, N. J., has announced plans for a technical symposium in "Technical Progress in Communication Wires and Cables", which will be held on December 8, 9 and 10 at the Berkeley-Carteret Hotel in Asbury Park, N. J. A technical program is being arranged which will offer a comprehensive coverage of the field of communication wires and cables. In addition, a banquet dinner is scheduled for the evening of December 9. Additional information on the symposium may be obtained from the Director, Coles Signal Laboratory, SCEL, Fort Monmouth, N. J.

CANADIAN NEWS

Playtex, Ltd. of Montreal, Que., is constructing a new plant at Arnprior, Ont., for the manufacture of foam rubber products and girdles. It has been estimated that construction will cost more than $750,000, while the plant will employ about 300 persons when production is in full swing. Completion of the plant is expected in early 1953. Playtex, Ltd. is a subsidiary of the International Latex Corp. of Dover, Del.

Precision Rubber Products Corp. of Dayton, Ohio, has announced plans to open a subsidiary plant in Montreal, Que., to be known as Precision Rubber Products of Canada, Ltd. The new unit is scheduled to begin operations early next year. It will manufacture mechanical goods, principally packings.

Fritzsche Brothers of Canada, Ltd., will shortly move from its present location at 77-79 Jarvis Street in Toronto, to its modern new building now being constructed at 81 Northline Road in the new East York industrial center. The new plant is expected to be ready for occupancy before the year's end.

Lake J. Fisher, manager of the Merchandising Distribution Department of the Seiberling Rubber Co. of Canada, died recently of a heart ailment. He was 63 years old. Born in Akron, Ohio, he was previously associated with the Goodyear Tire & Rubber Co. He went to Canada about 25 years ago. He was a member of the Seiberling 25-Year Club. His wife and son survive.

Edward G. Turner, associated with the Goodyear Tire & Rubber Co. of Canada, Ltd., has been elected chairman of the Toronto-York Division of the Industrial Accident Prevention Association.

Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., has resumed production following a prolonged strike over a new contract. Firestone employees will receive a basic increase of 8c an hour, plus retroactive pay and a non-contributory pension of $80 a month at the age of 65. An employee must be with the firm for 25 years to be eligible for this pension. It is expected that the Firestone settlement will provide a pattern for settlement of other contract negotiations in the industry.

Some 600 employees of the B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, Ont., who recently walked off the job in protest over the suspension of two employees who had refused to work overtime, have returned to their jobs. Management and union officials are meeting in an effort to clear up the dispute.

Commercial Solvents Corp. has released two new technical data sheets. Technical Data Sheet No. 9 covers "Butanol", while No. 11 concerns itself with "Diethyl Oxalate".

Litchfield Hurt in Auto Accident

Paul W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., escaped with only four broken ribs in a recent freak automobile accident which involved three cars, a trolley bus and a 45-foot dive over a railroad embankment. The chain of smash-ups began when Mr. Litchfield's car, out of control, shot away from the curb outside the Goodyear garage. By freak circumstance, Mr. Litchfield was trapped on the passenger's side of the front seat and unable to steer or throttle the car. Police said that as the car shot away from the curb it struck the front side of a trolley bus going in the same direction. After hitting the bus, the car spun sidewise and headed diagonally across the street. It cracked into a car waiting to make a left-hand turn, then slanted off and hit another car. Mr. Litchfield's car then jumped the curb, knocked down a guard rail, rolled down a railroad embankment and dropped over a 15-foot retaining wall landing right side up on the Baltimore & Ohio railroad tracks. Police believe Mr. Litchfield's foot may have caught in the accelerator as he started to slide across to get into the driver's seat. A passenger in one of the vehicles struck received neck injuries while two other persons suffered minor injuries.

"Aircat" Tire for Airplanes

Development of a new aircraft tire, which may be used for both military and commercial aviation, has been announced by the General Tire & Rubber Co. The low-pressure, extra-wide tire was developed by the company under a contract with the United States Air Force's Wright Air Development Center at Wright-Patterson Air Force Base, Dayton, Ohio. It was designed to fulfill the requirement for a tire with improved flotation, a tire able to maintain mobility in soft terrain without digging in and bogging down aircraft. The new tire, called the "Aircat," with a greater area of ground contact, fills this need. Measurements of 36 by 20.00-16 give an idea of the size of footprint which the Aircat leaves. In laboratory tests conducted by General Tire, the new unit withstood more than 500 "stops" on the test wheel—displaying two and a half times the durability required by U.S.A.F. specifications. The tire has also passed laboratory dynamometer tests. In addition, it showed superior flotation qualities during actual landings, take-offs, and taxi tests on all types of terrain.

United Clay Mines Corp. Sold

Purchase of stock control of the United Clay Mines Corp., Trenton, N. J., by thirty executives and employees for about $1,000,000, was recently announced. Ogden A. Kantner, formerly vice-president and general manager, was named president of the company. Mr. Kantner heads the group of new employee stockholders. The arrangement was in accordance with the wishes of the late president and company founder, George C. Crossley, who died in June, 1951. The $1,000,000 was paid to his executors. United Clay Mines supplies clays to the rubber, ceramic, paper refractory and adhesives industries.

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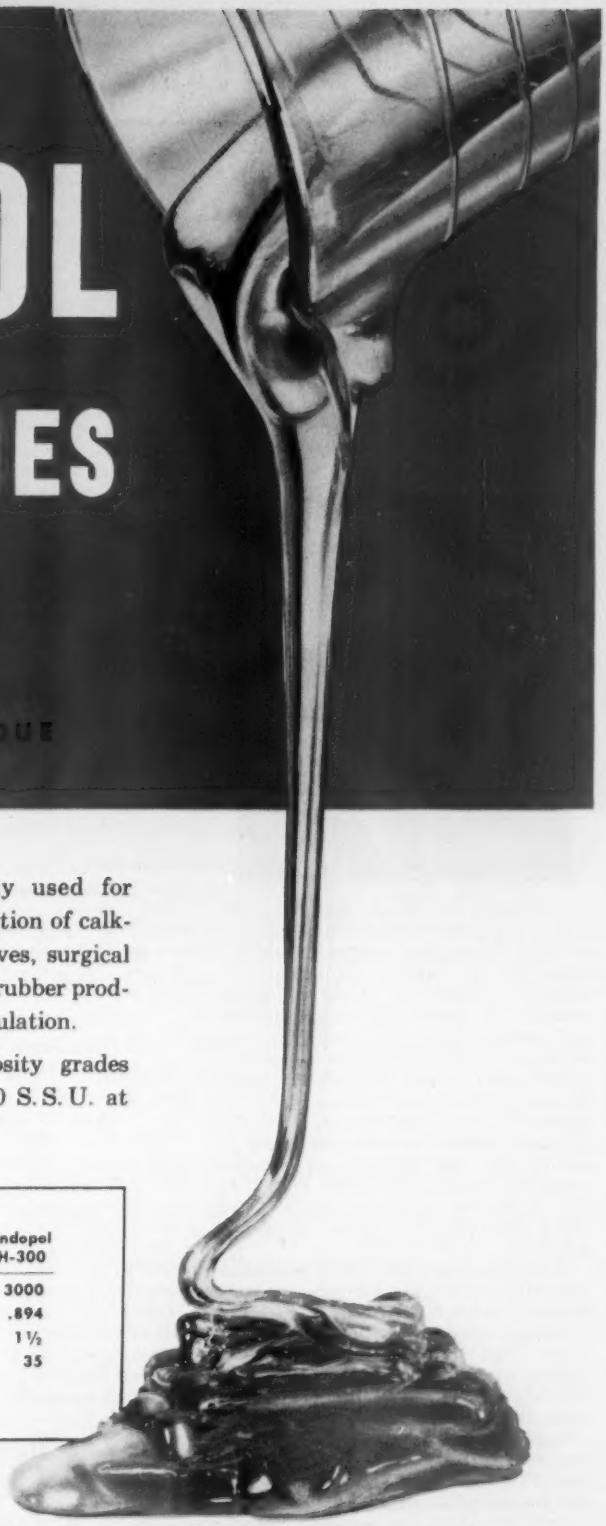

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OBITUARIES

Henry R. Minor

Henry R. Minor, rubber research consulting engineer, died on June 8th at the West Suburban Hospital, Oak Park, Ill. He was 71 years old. Mr. Minor received his education at Rensselaer Polytechnic Institute, New York University and Columbia University. Subsequently, he became city engineer, street commissioner and director of public works of Norwalk, Conn. Later, he became industrial engineer and director of research of the General Carbonic Co., where he was credited with inventing the first CO_2 fire extinguisher

purchased by the Walter Kidde Co. and used in the U. S. Navy. He also developed a curing process for cord tires and molded tubes utilizing inert gas and steam; invented a machine for testing the tensile strength of rubber, and a new method for treating rubber stock with CO_2 snow to dissipate high temperatures and prevent scorching of rubber. After eight years, General Carbonic was purchased by the Liquid Carbonic Corp. and Mr. Minor was appointed director of research. Here, he developed a new adhesive for adhering rubber to metal, and invented a process for the manufacture of sponge rubber from a water dispersion of rubber or natural latex.

Ten years later, Mr. Minor accepted a position as senior scientist with the U. S. Rubber Co. where he devised a method of softening rubber by heating in a closed vessel from which air is evacuated to a desired degree and inert gas used to restore the original atmospheric pressure, thereby controlling oxidation and depolymerizing temperature. He then invented a new foaming machine for making latex sponge and devised a water tower eliminator installed by the company. At other times in his career, Mr. Minor was associated with the Frost Rubber Co. and with the Airlastic Rubber Co. as research director.

In later years, Mr. Minor had been doing consulting work. During this time he conceived several new formulations and inventions including a sponge rubber paste for the manufacture of highly-expanded chemical sponge rubber; a blowing agent to eliminate the variables in making chemical sponge; a new moldless, molded sponge for seat cushions and a hydrostatic testing machine for determining the physical properties of elastomers. At the time of his death, Mr. Minor held over 35 patents in his name.

For many years a member of the American Chemical Society, Mr. Minor was also active in the Odd Fellows. A requiem mass was held at the Grace Episcopal Church in Oak Park on June 11. He is survived by his wife and two daughters.

Gustavus J. Esselen

Dr. Gustavus J. Esselen, vice-president of the United States Testing Co., Inc., and director of its Esselen Research Division, died on October 22 at his home in Swampscott, Mass. He was 64 years old. Prominent in the field of research for more than 40 years, he was founder and president of the Esselen Research Corp. which was merged with U. S. Testing in 1950. During World War II, Dr. Esselen was a consultant to the Baruch Rubber Survey Committee and later was chairman of the Tropical Deterioration Administrative Committee of the Office of Scientific Research and Development. Dr. Esselen was graduated from Harvard University in 1909 and was a teaching fellow in chemistry there for two years. He was on the research staff of the General Electric Co. and Arthur D. Little, Inc., before becoming vice-president and director of research for Skinner, Sherman and Esselen in 1921. His wife, son and two daughters survive.

Randolph H. Brown

Randolph H. Brown, senior vice-president of the Bill Brothers Publishing Co., New York, N. Y., publishers of the *India Rubber World*, died on November 2 at his country home at Lyme, Conn. He was 57 years old. Mr. Brown was graduated from the University of Wisconsin and served overseas with the Army in World War I. Later, he joined the Chicago office of Edward Lyman Bill, Inc., and then came to New York to organize and direct *Tires Service Station* magazine, of which he was general manager for many years until he became general manager of *Premium Practice and Business Promotion*, a position he held until his death.

S. Hoyt Price

S. Hoyt Price, Omaha district manager of the Replacement Tire Service Division of the B. F. Goodrich Co., died unexpectedly of a heart attack on October 26 at his home in that city. He was 60 years old. Mr. Price joined Goodrich as a tire salesman in 1927. In 1946, he became manager of the Oklahoma City district and remained there until moving to Omaha as district manager in May, 1948.

Fred H. Haggerson

Fred H. Haggerson, chairman of the board of the Union Carbide and Carbon Corp., died on October 14 at Roosevelt Hospital in New York City. He was 68 years old. Mr. Haggerson, who had been associated with the company for over 33 years, had been named board chairman in 1951. He had been made vice-president of the corporation in 1938, a director in 1941, and president and a member of the Executive Committee in 1944. Born in 1884 in Spalding, Mich., Mr. Haggerson attended Hamilton College and completed his education at the Law School of the University of Michigan, from which he was graduated with a bachelor of law degree in 1907. Funeral services were held at the Congregational Church of Manhasset, Manhasset, L. I., N. Y. on October 16 with interment at Nassau Knolls, Port Washington, N. Y. He is survived by his son and daughter.

Matthew Spring

Matthew Spring, former personnel manager of the Pequanoc Rubber Co., Butler, N. J., died on October 29 in Franklin Hospital, Newfoundland, N. J., after a long illness. He was 41 years old. He had been associated with the Bartholdi Hose Co. for 20 years. Mr. Spring was a director of the First National Bank of Butler and had been very active in civic affairs, particularly first aid activities. At the time of his death he was operating the Syl-Gas Co., a bottled gas business. His wife survives.

Samuel M. Hildreth

Samuel M. Hildreth, former vice-president and director of the Belmont Packing & Rubber Co., died on October 15 at Methodist Hospital in Brooklyn, New York. He was 82 years old. During the past few years, Mr. Hildreth had been active in fraternal and civic organizations. He is survived by his wife.

Battelle German Research Center

The cornerstone for a new research center at Frankfurt/Main in Germany was laid on October 31st at the site of the new Battelle Memorial Institute for Germany, which is being established by the Battelle Memorial Institute, Columbus, Ohio. Simultaneously, it was announced that Battelle is establishing another research center at Geneva, Switzerland, and has set up a program of fellowships for selected students in the universities of both Switzerland and Germany. In addition, research centers and fellowship programs for other countries of Western Europe are contemplated for the future. Plans call for the Frankfurt laboratories to be completed for occupancy by late spring of 1953. The physical plant there will consist of two major buildings, one four-story building 279 by 85 feet, and one three-story building 279 by 92 feet. These will be connected by a three-story bridge. Another one-story building, independent of these other units, will be constructed to house heating and pumping equipment.

IDEAL FOR ALL STOCKS. Besides costing less than any of the five process aids it replaced, and its other advantages, Sundex-53 mixes easily with natural, GR-S and reclaim stocks. In the picture above it is shown being added to a batch of heel stock.

QUICKER, MORE THOROUGH PLASTICIZATION. By using Sundex-53 only, the company has been able to produce a more uniform finished product. Quality heels will be blanked out of the stock leaving this warm-up mill and entering the cutter.

SINGLE GRADE OF SUNDEX REPLACES 5 PROCESS AIDS

Some years ago, as an economy step, the Beebe Rubber Company, Nashua, N.H., tried to reduce the number of process aids it used. Five different types were being employed in the processing of natural, GR-S and reclaim stock for heels, soles and soling slabs.

A Sun representative who had been called in recommended replacing all five process aids with Sundex-53 and the company took his advice. This one "general purpose" rubber-process aid has more than just simplified inventories and purchasing; *it has proved advantageous in other respects besides.* Because of the way it is refined, it works as well with light colored stock as with dark. It quickly breaks down reclaims and does not overprocess natural rubber and GR-S polymers. It costs less than the process aids it replaced, and has eliminated the potential danger of mixing errors.

For more information about Sundex-53 and other Sun Rubber-Process Aids, write to us for the booklet "Processing Natural Rubber and Synthetic Polymers," offered in coupon below.

ECONOMIES ALL ALONG THE LINE. Sundex-53 not only costs less than any of the five products it replaced, but it also saves money through simplification of ordering and stocking. The operator shown above is setting up a mold to vulcanize heels.

SUN OIL COMPANY, DEPT. RA-11, Philadelphia 3, Pa.

I am having trouble that may be due to inadequate process aids. I should like to have: ☐ the services of a Sun representative; ☐ the booklet "Processing Natural Rubber and Synthetic Polymers."

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TECHNICAL ASSISTANCE AVAILABLE. Sun's engineers are at your service for consultation on process aid and lubrication matters. It will pay you to utilize the broad experience they have gained in solving a wide variety of problems in many different types of industry.

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ATLAS-OMETERS

. . . used in Quality Control for plastic or rubber products at B. F. Goodrich Company

An important part of the tests at B. F. Goodrich Company Laboratories involves subjecting products to the destructive effects of weathering conditions they will be expected to meet in service. By using Atlas Fade-Ometers and Weather-Ometers it is often possible to obtain quickly, in advance of actual service, assurance that new materials will have satisfactory resistance to cracking, sun-checking, chalking, fading or bleeding of color, or to loss of elastic properties.

In the Fade-Ometer—used to check the reaction of any material or type of finish to the deteriorating effects of sunlight—plastic materials such as Koroseal are tested for permanence of bright color. The Weather-Ometer —which accurately duplicates rain, heavy dew, sunlight and thermal shock—offers complete control of these elements so that any desired climatic cycle can be obtained. Results of tests in the Weather-Ometer are used in the evaluation of the aging and weathering characteristics of rubbers and plastics under accelerated conditions corresponding to outdoor exposure.

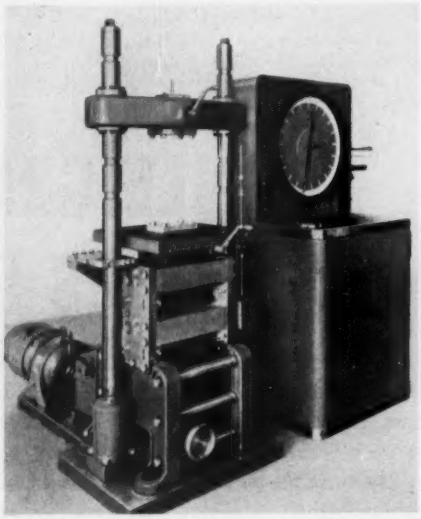
The machines are easy to operate, fully automatic, and may safely be left in continuous operation overnight without attention from the operator.

ATLAS ELECTRIC DEVICES CO.
361 West Superior St., Chicago 10, Illinois
WEATHER-OMETERS • FADE-OMETERS • LAUNDER-OMETERS

NEW EQUIPMENT

New Type of Universal Testing Machine

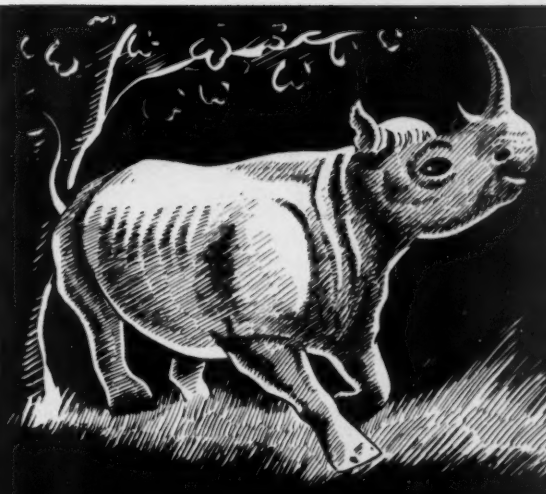
A totally new type of universal testing machine, incorporating an electric weighing system and electronically-controlled, motor-driven loading mechanism, has been announced by the Baldwin-Lima-Hamilton Corporation, Philadelphia 42, Penna. The new Model FGT Baldwin-Emery SR-4 testing machine has a capacity



of 50,000 lb. load and is said to embrace all of the following preferred characteristics of the "ideal" testing machine:

(1) Accuracy and sensitivity corresponding to that of the best scales, i.e., weighing and measuring tolerances of 0.2% of reading; (2) High speed response of indicator or recorder to dynamic as well as static loads; (3) Extreme structural stiffness and lateral rigidity; (4) Wide range of loading speeds under precise stepless control. (Standard loading speed is 0.025 to 9.0 inches per minute); (5) Automatic load control for maintaining constant load, constant strain, constant rate of loading, or constant strain rate, thus enabling determination of creep, rupture, and relaxation properties of materials; (6) Single convenient location for test specimens in both tension and compression tests; (7) Automatic reversals of load, i.e., tension to compression to tension; (8) Quick-acting, semi-automatic operation for "production testing." Printing of critical test values included when desired, and (9) Adaptability to stress analysis of parts and components of structures on which SR-4 strain gages or brittle coating techniques are utilized.

Testing machine loads are measured by means of two SR-4 universal load cells of 30,000 lb. capacity each, at the base of the two vertical tie rods, and resistance wire strain gage instrumentation of the totalizing circuit type which provides instantaneous response. Three load ranges are provided on a separate indicator with 24-in. diameter dial having 1000 graduations in 66 in.— 0-50,000 lb., 0-10,000 lb., and 0-2000 lb. Lower ranges



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Latex Thickeners

for NATURAL, SYNTHETIC, RUBBER and RESIN Latices

POLYCOS 296 and 296N

. . . are sodium polyacrylate thickeners available as high (296) and medium (296N) viscosity grades. They are water soluble anionic colloids furnished as straw-colored, homogeneous solutions containing 15% solids.

POLYCOS 296 and 296N

. . . are recommended as stabilizers, protective colloids and thickeners for natural, synthetic, rubber and resin latices. They are particularly noted for their exceptionally high thickening action on most types of natural and synthetic latices. Their unique adhesive, suspending, emulsifying and film-forming characteristics, make them adaptable to many industrial uses.

Alone, Polycos 296 and 296N produce clear, slightly yellow, films. These acrylic thickeners are fully saturated compounds and deposited films will not oxidize or embrittle with age; they will not alter color values of pigments or dyes.

For complete information and data, write for Bulletin P-27.

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are available by fitting a detachable SR-4 Universal load cell on the crosshead and connecting it into the load indicating dial.

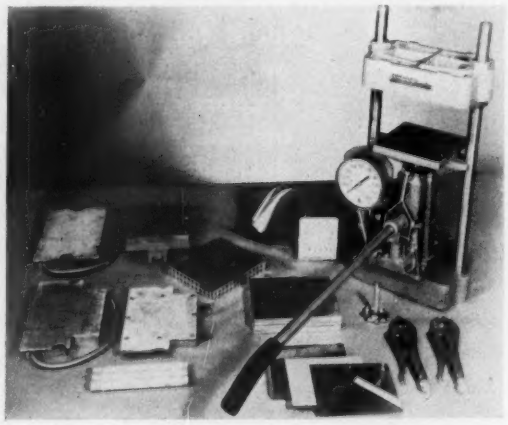
The load system utilizes a single enclosed reversing screw rotated by a 2-hp. motor under thyratron tube type control over a speed range of 360 to 1. The maximum stroke is 8 in. The test table is 20-in. square. Maximum vertical space is 24 in. for both tension compression tests. Clearance between columns is 21 in. The crosshead is adjusted by means of the main motor drive.

Associated stress-strain recording equipment can take signals both from load cells and from an SR-4 type extensometer. For normal rates of recording an SR-4 converter is interposed so that a standard Baldwin Microformer can be used. An X-Y Recording Potentiometer can also be used. For high straining rates or for alternating loads, oscillographs or oscilloscopes may be used to record load vs. strain, the latter on a persistent screen. Signals are fed through Ellis pre-amplifiers.

Optional accessories include automatic equipment for printing values of "extension-under-load," offset yield strength, or ultimate strength controlled by electronic devices which trigger the printer.

Harco Laboratory Press

A new type laboratory press, which can be utilized for curing rubber, embossing, laminating, gluing under pressure, experimental plastic dies and duplicating die parts, among other applications, has been introduced by Harco Industries, Inc., Rochester 5, N. Y. Called the



Harco Press Model P-6612, it is capable of handling pressures from 0 to 12 tons.

Only 23 inches high, the Harco Laboratory Press requires little operating space. The movable platen is 6 x 6 inches with 8 inches between strain rods, and with normal die space up to 8 inches on the standard model. Additional height can be added if desired. Automatic platen arm moves the lower platen into pressure position with single stroke, thus eliminating tedious pumping to close die space. Pressure cycles are accurately measured by the Harco Timer, calibrated in 15 second units up to 15 minutes. Water or air-cooling platens cool material while under pressure. Heating platens are designed for maximum heat transfer in minimum heating time.

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An OUTSTANDING
Rubber Compounding Resin

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Low Specific Gravity
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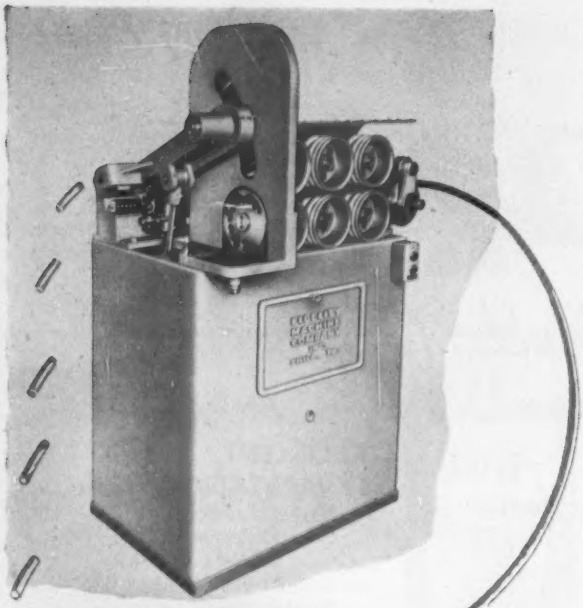


Cut Hose

automatically

at 45 pieces a minute with *NEW*

***Fidelity* Hose**

Measuring and Cutting Machines

Revolutionary in design, the Fidelity Automatic Hose Measuring and Cutting Machine enables you to reduce labor costs, improve quality, boost output, prevent waste, and save floor space.

The Fidelity feeds, measures, counts and *cuts* hose automatically to any present length and holds the closest tolerances. It takes only a moment to change length or diameter. One operator can handle several of these new Cutting Machines. No special skills are required and the operation is 100% *safe*.

Let us send you full details on this new labor-saving development for cutting rubber. Write today for Catalog H.

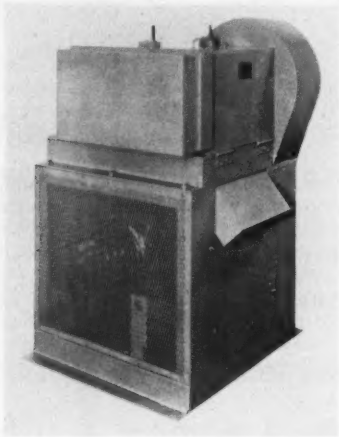
Manufacturers of intricate precision machinery since 1911.

FIDELITY MACHINE COMPANY INC.

3908 Frankford Ave., Philadelphia 24, Pa.

Cumberland Dicing Machine

A completely new "notched-knife" principle of dicing sheet plastic into tiny cubes is featured in a new dicing machine developed by the Cumberland Engineering Co., Inc., Providence, R. I. The new principle is said to be the simplest, least expensive method of dicing yet

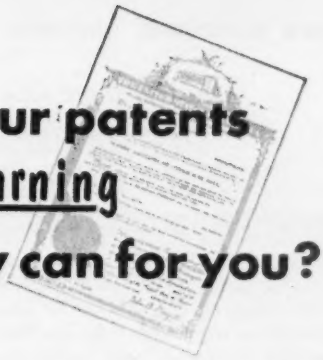


devised. The machine is also reported to have many applications in the rubber industry.

The "notched-knife" principle eliminates the need of dicing plastic by the older method of slitting sheet stock into strands and then cutting the slitted strands into cubes. For this new dicing method, the Cumberland machine is equipped with a pair of power-driven feed rolls, one stationary knife and four rotating knives. For special applications requiring extremely high rates of feed, eight rotating knives are used. Input speed of the dicer ranges from 10 to 125 feet per minute, depending on the individual user's requirements. Extremely versatile, the machine dices many types of plastic (sheet stock) into a wide variety of cube sizes.

Abrasion?

SEE PAGE 176



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Hand Grip Rubber Gauge No. 3-B

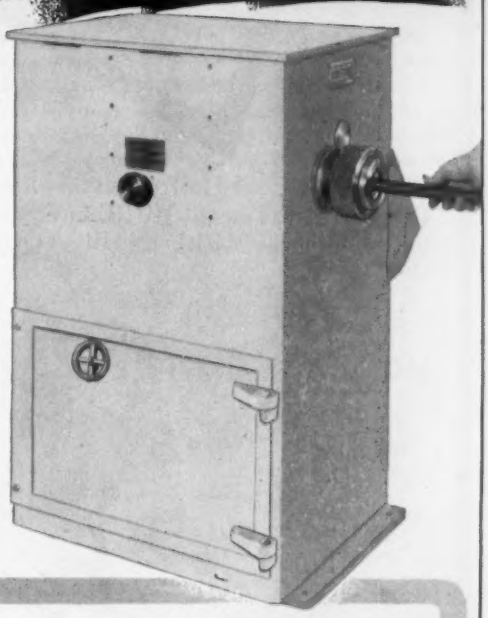
Height .....9"	Length ..... 9¾"	Range .....½"
Depth of Throat ....6½"	Dia. 50 Divisions Each Div. 1/1000"	Weight ....4 lbs. Frame Aluminum

Designed for gauging stock as it is coming from the calender.

FRANK E. RANDALL CO., Inc., Waltham 54, Mass.

Every Plant in the Rubber Industry Should Have--

THE HOLMES Rotary STOCK CUTTER



MINIMIZES OPERATING TIME

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SAVES EXPENSIVE MATERIAL

For low cost, high speed, volume production --you should have the new Holmes Rotary Stock Cutter in your plant. Cuts up to 36,000 pieces per hour. Handles stock up to 3" in diameter...and...cuts pieces up to 3" in length. Low in cost--will quickly pay for itself.

WRITE OR WIRE FOR SPECIFIC DETAILS--regardless of your particular requirements. With 51 years know-how specializing in machinery and molds for the rubber industry--Holmes can help you solve your problems, too, as they have for so many others. No obligation, of course.

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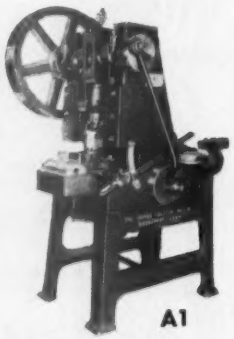
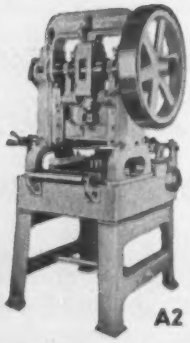
For MORE than Half a Century the name COULTER has meant MORE in higher quality cuttings . . . MORE IN GREATER PRODUCTION.

MODEL A-1

Cutting Heels at high speed production or short runs.



A1



A2

MODEL A-2

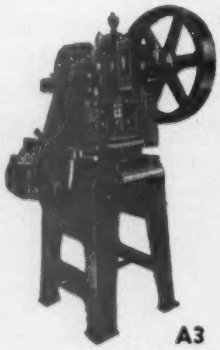
Cutting Multiple Heels, Half and Full Soles with stock grain.

MODEL A-3

Cutting Multiple Heels and Taps with or across stock grain.

MODEL A-2s
(Not illustrated)

Cutting across grain of stock.



A3

COULTER PRODUCTION MACHINES SINCE 1896

Gardsman Portable Temperature Controller

The Gardsman Portable Temperature Controller, which permits intermittent use of a control instrument at different locations throughout the plant, has been developed by the Taco West Corp., 525 No. Noble St., Chicago 22, Ill. Precision control is accomplished by merely plugging the new instrument into a wall outlet and plugging the unit to be controlled into the instrument. Then, by simply inserting the instrument thermocouple into an oven, bath, thermocouple well, etc., the

true temperature will be indicated by the upper pointer and may be controlled at any desired point by setting the lower pointer to the correct scale position by means of the external setting knob.

Two power outlets provide an unusual degree of versatility to this instrument by enabling it to control not only temperature but other factors, blowers, fans, agitators as well. Thermocouple break protection is provided at no extra cost, protecting the thermal system from overheating if a thermocouple should burn out or break for any cause. All models have a dual scale range of 50 to 500° F., iron-constantan, and 0 to 2000° F., chromel-alumel, with a selector switch to operate the instrument on one range or the other. Two six-foot thermocouples, one iron-constantan and the other chromel-alumel, are standard equipment.

This portable Gardsman controller is available in three different models. Model JE is the "on-off" type controller; Model JEP incorporates the same proportioning type control as in the standard Taco West proportioning controller, and Model JEL is a combination instrument serving either as a high limit controller or an "on-off" controller.

All three models employ the basic features that distinguish the company's line of precision instruments. Magnetic amplification replaces the usual vacuum tubes, thus eliminating service interruption due to tube failure and assuring instantaneous starting. Two pilot lights indicate whether the instrument is heating or cooling the controlled unit. The accurate telephone type relay of the instrument is supplemented by an integral contactor of 1700 watt capacity, thus permitting the use of these instruments directly on most load circuits without an external contactor.

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72-75% LATEX CONCENTRATE

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- Natural and Synthetic Latex Compounds
- Plastisols

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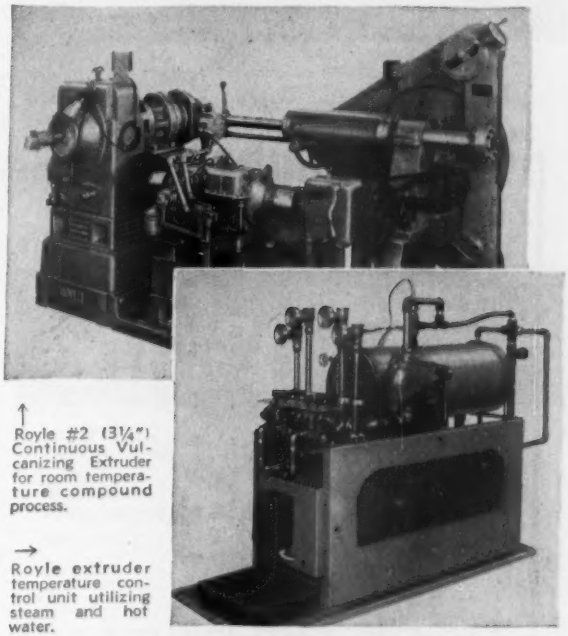
Of Particular Importance

To the Wire Insulating Industry

The room temperature compound process and associated equipment recently developed by the Western Electric Company, Incorporated, offer nine important advantages. These advantages begin with the storage of completely mixed, ready-to-extrude, rubber, GR-S, or Neoprene compounds and extend to a smoother and improved appearance for the finished product.

The complete extruder vulcanizing portion of the room temperature compound process is available to insulated wire producers* from John Royle and Sons who, for seventy-two years, have been building extruding machines to meet the most exacting process requirements.



↑ Royle #2 (3¼") Continuous Vulcanizing Extruder for room temperature compound process.

→ Royle extruder temperature control unit utilizing steam and hot water.

CHECK THESE ADVANTAGES:

- Improved diameter control
- Reduction in compound scrap
- Reduction in electrical faults
- Permits storage of completely mixed compounds
- Permits more economical scheduling of mixing equipment
- Eliminates "warm-up" operation
- Possible mill-room economies
- "Hot" machines may be converted
- Finished product has smoother finish—better appearance

Licensees of Western Electric Company

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Types, grades and blends
for every purpose, wherever
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be they Synthetic, Natural,
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REVIEWS

BOOKS

Styrene: Its Polymers, Copolymers and Derivatives. Edited by R. H. Boundy and R. F. Boyer. Published by the Reinhold Publishing Corp., 330 West 42nd St., New York 36, N. Y. 6½ x 9 in. 1304 pp. $20.00. (A.C.S. Monograph No. 115).

Several months ago the first comprehensive book on butadiene was issued, i.e., "Light Hydrocarbon Analysis" (*R.A.*, p. 119, April, 1952). It was inevitable that a sister publication covering styrene be published, and the current book amply fills in the data. It is the first complete treatment of styrene to be published, and contains a complete account of the polymerization, copolymerization, chemical modification and manufacture of the material, as well as of its industrially important derivatives.

Starting with a history of styrene monomer and polymer dating back about 100 years, the book then describes current methods of manufacture, followed by detailed chapters on physical properties, methods of handling and analysis, and the chemistry of styrene. The theory and practice of styrene polymerization is next discussed, together with a brief chapter on the uses of styrene monomer, including its role in the synthetic rubber program. The remainder of the book deals with the physical behavior of polystyrene, styrene derivatives and resins, German styrene practice and copolymers of styrene, and concludes with a lengthy description of the fabrication of polystyrene.

The book has 22 chapters, as follows: (1) History; (2) Manufacture of Styrene Monomer; (3) Physical Properties of Styrene Monomer; (4) Chemistry of Styrene Monomer; (5) Analysis of Styrene Monomer; (6) Handling Styrene Monomer; (7) Polymerization of Styrene; (8) Summary of Uses for Styrene Monomer; (9) Molecular Weight and Solubility of Polystyrene; (10) General Physical Properties of Polystyrene; (11) Optical and Electrical Properties of Polystyrene; (12) Rheological Properties of Polystyrene; (13) Degradation of Polystyrene; (14) Chemical Alteration of Styrene Polymers; (15) Alpha-Methylstyrene; (16) Ethylvinylbenzene and Divinylbenzene Mixture and Its Copolymers; (17) Halostyrenes and Other Vinyl Aromatic Compounds; (18) Styrene Resins; (19) A Survey of Styrene and Polystyrene in Germany; (20) Copolymerization; (21) A Survey of Patent Literature on Styrene Copolymers; (22) Fabrication of Polystyrene.

•

DuPont—The Autobiography of an American Enterprise. Published by E. I. du Pont de Nemours & Co., Wilmington, Delaware. Distributed by Charles Scribner's Sons, New York, N. Y. 9 x 12 in. 138 pp.

This is the story of the DuPont organization and all of its ramifications, issued in commemoration of the 150th anniversary of the founding of the company on July 19, 1802. Rarely has so comprehensive and attractive a volume been published to cover the birth and growth of an industrial organization, in this case one which parallels the growth of the country itself.

In words and pictures, the book traces the arrival of Eleuthère Irénée du Pont in America in 1800; the initial production of gunpowder in a small plant on the banks of the Brandywine; the early financial difficulties of the company; the contributions of Alfred du Pont, the chemist, and General Henry du Pont, the businessman; development of explosives after the Civil War; inauguration of research activities; the company's role in World War I; the introduction of dyes, rayon and cellophane, followed by neoprene and nylon; the ordnance plant program undertaken by the company in World War II; the post-war expansion program, and, finally, the present position of the company, with emphasis on its people, its management, its research, and its over-all financial policy.

As stated in the foreword, this is truly a book without an author as it is a story without an end. It is a story set down over the years, written into the record by the lives of thousands who have participated. It is the story of people, and what they have created with manpower and imagination.

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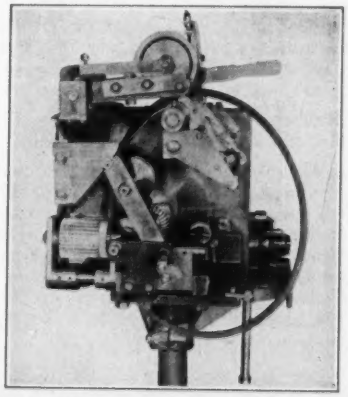

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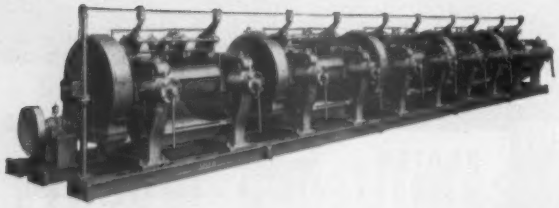

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BOOKLETS, CATALOGS, etc.

Symposium on Acoustical Materials. (Special Technical Publication No. 123). American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna. 6 x 9 in. 36 pp.

It is the purpose of this symposium to discuss briefly the origin and history of the acoustical materials industry, and to outline the many and varied problems to be solved. The papers discuss problems of sound absorption, maintenance, applications and the relationship of many physical properties, all of which fall within the province of ASTM Committee C-20 on Acoustical Materials. Following an introduction by H. A. Leedy, chairman of Committee C-20, there is a "Brief History of the Acoustical Materials Industry" by Wallace Waterfall. Also included in this book are papers and discussions on "The Measurement of Sound Absorption" by Hale J. Sabine; "Combustibility of Acoustical Materials" by Mr. Waterfall; "Maintenance of Acoustical Materials" by Peter Chrzanowski and Albert Landon; "The Erection of Acoustical Tile" by L. F. Yerges, and "Basic Properties of Acoustical Materials" by William Jack.

•

Condensed Reference File of Bakelite and Vinylite Plastics and Resins (1953). Bakelite Co., 260 Madison Ave., New York 16, N. Y. 8½ x 11 in. 16 pp.

Properties and uses of more than 50 Bakelite and Vinylite plastics and resins are described and illustrated in this new, revised reference file. The publication features 110 photographs showing applications and finished products. Short descriptions of the wide range of special and general-purpose Bakelite phenolic, styrene and polyethylene and Vinylite plastics and resins are also presented. Essential information on specific properties of the individual plastics, their industrial or commercial applications, and their ability to be molded, extruded, calendered or otherwise formed in the manufacturing processes are discussed.

•

Aniline Black. By R. D. Greene. (Calco Technical Bulletin No. 821). Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J. 8½ x 11 in. 10 pp.

In this interesting bulletin, the author has undertaken a presentation of the history, uses and attributes of aniline black. The different types of aniline black are outlined as to their composition and ultimate use. Instructions for use are also given, while expected results are outlined. The author concludes that aniline blacks, when properly handled, produce uniquely deep, rich and fast shades which have stood the test of time and are still foremost in the realm of printed blacks.

•

Kalabond Rubber-to-Metal Adhesive. Chemical Division, General Tire & Rubber Co., Akron, Ohio. 8½ x 11 in. 8 pp.

This three-color brochure describes the company's relatively new rubber-to-metal adhesive which bonds natural rubber, GR-S, neoprene, and nitrile rubber compounds to iron, steel, stainless steel, aluminum, brass, magnesium, monel, nickel and zinc. A summary of adhesion data is provided, while a chart listing adhesion in pounds pull in shear is also included. A discussion of the test results is given. One section of the brochure is devoted to a discussion on how to use the product for best results.

•

Products and Services for Industry and Agriculture. (3rd Edition). American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. 8½ x 11 in. 36 pp.

This catalog contains a convenient listing and description of the products and services that the company is now offering to industry and agriculture. A product index is arranged to provide an easy reference to the products and services described. In the body of the catalog, the products and services are listed under the divisions and departments through which they are sold. A full breakdown is provided for the Calco Chemical Division, including the Intermediate and Rubber Chemicals Department.

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REVIEWS (CONT'D)

Fluid Rubber Compositions: Their Preparation and Applications. (Broadsheet No. 2). Rubber Technical Developments, Ltd., 78 Bridge Road East, Welwyn Garden City, England. 8½ x 11 in. 6 pp.

The term "fluid rubber", in this instance, covers compositions containing neither water nor volatile solvent which can be poured and set to form elastic, soft rubber or hard rubber articles. The principles underlying the preparation of these compositions, the types of end-products that can be obtained, and the applications for such products are described in this report. Among products discussed are printer's rollers, battery boxes and various molds for plaster casting. Among preparations discussed are those based on "20 Mooney" rubber, Rubbone N, and Rubbone N and depolymerized rubber.

•

Carbon Black Pigments. Special Blacks Division, Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass. 8½ x 11 in. 16 pp.

This is the latest revised edition of the Cabot guide to its various special types of blacks, including those for the paint, ink, plastics and paper industries. The electrical properties of these blacks are outlined in a special section, while another section is devoted to the testing procedures used by the company. Technical data on the blacks, including specific gravity, particle size, tinting strength, apparent density, etc., are effectively tabulated in a two-page spread.

•

Pepton 22 Plasticizer in Oil-Extended GR-S. Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J. 8½ x 11 in.

Issued as Supplement No. 1 to Calco Technical Bulletin No. 816, this report, as its title indicates, covers the application of Pepton *22* in oil-extended GR-S. Data on the incorporation of this plasticizer in both GR-S X-629 and X-628 is given, the first for the polymer alone and the latter for a typical rubber compound. Mooney viscosity figures in both cases indicated that Pepton *22* has a decided plasticizing effect.

•

The Story of Safety. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. 9 x 12 in. 28 pp.

In telling the story of the safety programs in effect at DuPont installations, this booklet points out that safety is the responsibility of management, in all phases and at all levels of organization. Well-trained people, using every available precaution, can avoid all personnel injuries.

Abrasion?
SEE PAGE 176

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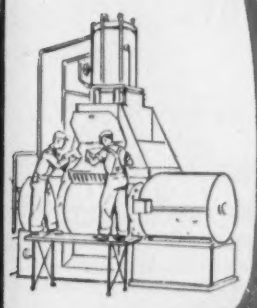

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REVIEWS (CONT'D)

Vinylite Resin VAGH for Coatings. (Technical Release No. 6). Bakelite Co., 260 Madison Ave., New York 16, N. Y. 8½ x 11 in. 16 pp.

Additional data for paint and industrial coatings manufacturers on the wide compatability of Vinylite Resin VAGH with other film-forming material is presented in this revised bulletin. One of the newer modified vinyl chloride acetate polymers, the product is described as having made possible many new types of fortified coatings. Adhering well to many other types of finishes, particularly to the vinyl butyral resin "wash primers," Vinylite Resin VAGH is described as having broad possibilities in the field of industrial coatings alone. Latest information on the basic properties of the product and suggestions for its proper use are included in the bulletin.

•

Di-Acro Precision Machines for Die-Less Duplicating. O'Neil-Irwin Manufacturing Co., Lake City, Minn. 8½ x 11 in. 36 pp.

Equipment used in the Di-Acro system of die-less duplication is described and illustrated in this bulletin. Units described include benders, rod parters, shears, power shears, punch presses, notchers, standard brakes, finger brakes, radius brakes, and rollers. Each of the units is described as to construction features and uses. The bulletin is illustrated with photographs and drawings.

•

Blaw-Knox Process Equipment. (Bulletin 2403). Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 30, Penna. 8½ x 11 in. 12 pp.

This illustrated brochure describes a variety of process equipment designed and manufactured by the company. Included are such items as autoclaves, agitator assemblies, quick-opening doors, extractors, cookers, resin plants, package pilot plants, and package heating and cooling units. Dimensions of the various units are given. The bulletin is illustrated with photographs, cutaway drawing and diagrams.

•

Gwilliam Ball and Roller Bearings. (Catalog No. 28). Gwilliam Co., 360 Furman St., Brooklyn 2, N. Y. 8½ x 11 in. 16 pp.

The company's line of ball thrust bearings, roller thrust bearings, step bearings, journal roller bearings, industrial roller bearings, and special bearings is described in this catalog. The various types are illustrated and standard sizes listed in tabular form.

Abrasion?
SEE PAGE 176

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, NOV. 6, 1952

Natural Rubber

The price of spot rubber on the New York Commodity Exchange has moved in the rather narrow range of 1.25c since our last report (October 9), high for the period being 27.75c reached on November 5 and 6, and low being 26.50c reached on October 10, and again on October 14, 15, 20 and 21. The average price of spot rubber for the month of October was 27.06c based on 22 trading days. This compares with an average of 27.42c in September.

The feeling persists in some trade circles that the trend of consumption of natural rubber is still upward, and that a figure of 45,000 tons monthly average will be seen in the first quarter of 1953. Slightly higher prices prevailing for natural rubber, however, may serve to slow the rise in consumption.

There has been a marked trend toward substituting natural for synthetic and this may well be expected to continue if the price of natural keeps within reasonable levels. Some of the friendly sentiment is also predicated over uneasiness in the political situation in the Far East and the probability of some action being taken by the U. S. which would be helpful to the economy of this area.

Today's quotations for the outside market, London and Singapore, follow:

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.27¼
December	.27
January	.26¾
Thin Latex Crepe:	
Spot	.36
Thin Brown Crepe, No. 2	.24¾
Smoked Blankets	.24½
Flat Bark Crepe	.22¾

London Market

(Standard Smoked Sheets)

December	26.83 - 27.12
January-March	26.83 - 27.12

Singapore Market

(Standard Smoked Sheets)

December	25.74 - 25.78

Closing Rubber Prices on New York Commodity Exchange (No. 1 R.S.S. Contract)

FROM OCTOBER 10 TO NOVEMBER 6

Oct.	Spot	Dec.	Mar.	May	July	Sales
10	26.50	26.25	25.00	24.70	24.30	58
11	——	——	——	——	——	——
12	——	——	——	——	——	——
13	——	——	——	——	——	——
14	26.50	26.10	24.85	24.50	24.10	0
15	26.50	26.20	24.90	24.60	24.15	16
16	27.00	26.95	25.60	25.05	24.75	40
17	27.00	27.00	25.55	25.25	24.85	44
18	——	——	——	——	——	——
19	——	——	——	——	——	——
20	26.50	26.60	25.15	24.80	24.40	0
21	26.50	26.85	25.25	24.80	24.35	11
22	27.00	28.00	26.38	26.00	25.60	123
23	27.00	27.95	26.19	25.85	25.60	64
24	27.38	28.25	26.65	26.20	25.80	33
25	——	——	——	——	——	——
26	——	——	——	——	——	——
27	27.25	27.55	25.95	25.50	25.10	23
28	27.75	28.10	26.80	26.00	25.45	78
29	27.12	27.50	26.25	25.50	25.05	33
30	27.25	27.90	26.70	26.00	25.40	80
31	27.75	27.95	26.75	26.00	25.50	72
Nov.						
1	——	——	——	——	——	——
2	——	——	——	——	——	——
3	27.62	28.00	26.70	26.00	25.45	2
4	——	——	——	——	——	——
5	27.75	28.20	26.75	26.00	25.45	35
6	27.75	28.20	26.60	25.85	25.30	11

Scrap Rubber

Trade reports indicate that scrap is in plentiful supply with the exception of some specialty items such as red tubes. There are evidences of a slight up-turn in the market although present buying prices are still considerably below the official Office of Price Stabilization ceilings, published below:

(Prices Delivered Akron)

Mixed tires	ton	$26.00
Mixed beadless tires	ton	34.00
Light colored carcass	ton	130.00
Black carcass	ton	50.00
No. 1 peelings	ton	65.00
No. 2 peelings	ton	42.00
No. 3 peelings	ton	38.00
Buffings	ton	30.00
Truck and Bus S.A.G.	ton	28.00
Passenger S.A.G.	ton	28.00
Mixed S.A.G.	ton	26.00
Light colored tubes	lb.	.16
Natural rubber red tubes	lb.	.16
Natural rubber black tubes	lb.	.11½
Mixed natural rubber tubes	lb.	.10
Butyl rubber tubes	lb.	.057
GR-S rubber tubes	lb.	.02
Mixed synthetic tubes	lb.	.03

Reclaimed Rubber

According to advices from the trade, demand for reclaimed rubber continues to increase. September consumption has been reported as the largest since early in the year and October should be still higher. The outlook for November is for continued demand. OPS-established prices for reclaimed rubber follow:

(Prices for All Areas Except Calif.)

Premium Grade Whole Tire	.10½
First Line Whole Tire	.10
Second Line Whole Tire	.09½
Third Line Whole Tire	.09¼
Fourth Line Whole Tire	.08¾
Black Carcass	.14½
No. 1 Light Colored Carcass	.20¾
No. 1 Select Peel	.11¾
No. 1 Peel	.10½
Butyl Tube Reclaim	.14½
S.P. Natural Rubber Black Tube	.21
Natural Rubber Black Tube	.20
Natural Rubber Red Tube	.24¼
Natural Rubber Gray Tube	.24¼

Cotton Tire Fabrics

What market activity there has been during the past period has centered on chafers, while there has been very little activity in the cotton tire cord line. Trade sources are hesitant what changes, if any, the new year will bring in the cotton tire fabric market. Market prices remain at substantially the same levels, as shown below:

Standard, Peeler, 12/4/2	lb.	.85
Extra Staple, Peeler, 12/4/2	lb.	.91

Chafers

14.4 oz. (per square yard)	lb.	.81
9.25 oz. (per sq. yard)	lb.	.75½
11.65 oz. (per sq. yard)	lb.	.72
8.9 oz. (per sq. yard)	lb.	.77½

Cotton

Since our last report (October 9), the price of middling uplands on the New York Commodity Exchange has moved in a range of 2c, high for the period being 37.95c reached on October 10, and low being 35.95c reached on October 29. The average price of middling uplands for the month of October was 37.32c based on 22 trading days. This compares with an average of 39.75c in September.

The International Cotton Advisory Committee has set world production of cotton in the 1952-53 season at 27,300,000 bales, a decrease of more than 1,000,000 bales from the previous year. This estimate, which excludes Russia, China and Eastern Europe, is based on declines in the United States, Mexico, India and Brazil which have more than offset gains in Egypt, Pakistan and the Middle East, the committee stated.

The Department of Agriculture has announced that pooled stocks of 1951 cotton will not be offered for sale by the Commodity Credit Corporation during the period when producers are marketing the bulk of the 1952 crop. It was also reported that offers to sell the small stocks of 1948-49 and 1950 cotton are being discontinued.

Domestic and foreign demand for American cotton, even at present consumption levels, should require production of a 14,500,000 bale crop annually for some years to come, according to Read P. Dunn, director of the Foreign Trade Division of the National Cotton Council. He pointed out that for the past few years, net civilian consumption has been about 8,000,000 bales annually. This could go up by 1,000,000 bales during the next 10 years because of population increases, Mr. Dunn declared.

Quotations for middling uplands on the Exchange follow:

	Oct. 9	November 6		
	Close	High	Low	Close
Dec.	37.83	36.30	35.74	36.24
Mar.	37.87	36.65	36.11	36.58
May	37.52	36.77	36.29	36.72

Synthetic Rubber

(Dry Types—Per Pound)

Butaprene NF	.490 - .500
Butaprene NL	.500 - .510
Butaprene NAA	.540 - .550
Butaprene NXM	.580 - .590
Chemigum 30N4NS	.500 - .510
Chemigum 50N4NS	.500 - .510
Chemigum N3	.580 - .590
G-E Silicone Rubber (compounded)	3.15 -4.00
G-E Silicone Gum (not compounded)	—— -4.48
GR-I	—— - .2075
GR-S	—— - .230
Hycar OR-15	.580 - .590
Hycar OR-25	.500 - .510
Hycar OS-10	.550 - .560
Neoprene Types CG and AC	—— - .500
Neoprene Type E	—— - .650
Neoprene Types FR and KNR	—— - .800
Neoprene Type GN	—— - .380
Neoprene Type GN-A	—— - .380
Neoprene Type RT	—— - .400
Neoprene Type S	—— - .380
Neoprene Type W	—— - .400
Paracril B	.500 - .510
Paracril BJ	.500 - .510
Paracril C	.580 - .590
Silastic (compounded)	2.35 -4.40
Thiokol Type A	—— - .470
Thiokol Type FA	—— - .640
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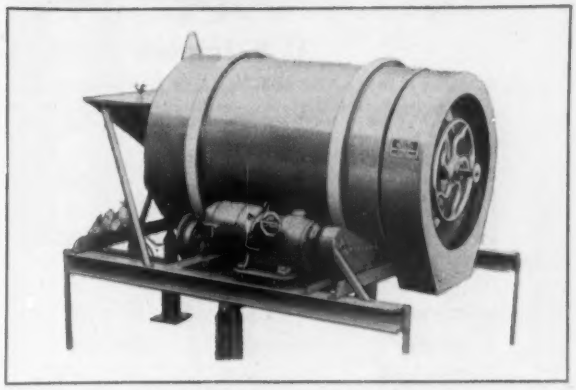

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STATISTICS *Of Interest to the Rubber Industry*

U. S. Imports and Re-Exports of Natural Rubber

	GROSS IMPORTS										RE-EXPORTS		TOTAL NET IMPORTS
	Natural Rubber (Dry)			Natural Rubber (Latex)			Guayule						
Year	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Total Gross Imports Long Tons	Long Tons	Total Declared Value	Long Tons
1936	467,064	152,072,496	14.54	19,852	6,659,899	14.98	1,229	286,552	10.41	488,145	12,581	4,488,223	475,564
1937	574,600	237,307,041	18.44	23,185	10,213,670	19.67	2,691	745,873	12.37	600,476	7,948	3,386,408	592,528
1938	397,640	125,373,864	14.08	11,944	4,168,127	15.58	2,508	628,886	11.19	412,092	5,652	1,799,124	406,440
1939	469,946	167,586,780	15.92	27,437*	10,467,552	17.03	2,233	463,345	9.27	499,616	13,125	5,832,618	486,491
1940	781,202	303,308,823	17.33	33,789	14,593,466	19.28	3,633*	758,007	9.31	818,624	7,060	3,197,136	811,564
1941	989,498	401,976,317	18.14	34,797*	15,965,627	20.48	4,881	1,145,767	10.48	1,029,176	5,376	2,757,872	1,023,800
1942	266,276	112,537,426	18.87	10,646	5,630,667	23.61	5,523	1,660,792	13.42	282,445	10,856	5,913,386	271,589
1943	50,358	31,369,198	27.81	1,890	1,312,202	31.00	7,678*	3,636,789	21.14	59,926	22,583	16,446,707	37,343
1944	103,847	73,908,549	31.77	3,091	2,092,211	30.22	6,701*	3,351,233	22.33	113,639	9,739	8,712,695	103,900
1945	134,408	95,814,102	31.82	4,773	3,115,853	29.14	10,040	5,963,797	26.52	149,221	9,509	7,201,746	139,712
1946	376,502	228,796,110	27.13	8,421	5,843,085	30.98	5,344	2,859,246	23.89	390,267	7,711	5,331,954	382,556
1947	691,087	306,951,814	19.83	17,542	9,787,722	24.91	2,884	1,492,825	23.11	711,513	4,121	2,354,494	707,392
1948	702,293	290,849,177	18.49	32,745	18,288,223	24.93	302	71,330	10.53	735,340	6,672	3,259,324	728,668
1949	630,808	225,343,624	15.95	29,743	14,968,650	22.47	....	.....	....	660,551	6,253	2,746,109	654,298
1950	747,109	416,222,598	24.87	54,401	41,764,486	34.27	739	254,331	15.37	802,249	8,640	6,832,821	793,609
1951	677,874	727,343,348	47.90	54,963	80,178,309	65.12	1,619	1,258,941	34.71	734,456	2,603	3,947,740	731,853
1951:													
June	51,811	61,809,219	53.26	4,692	7,475,970	71.13	120	84,110	30.14	56,623	224	423,689	56,399
July	67,511	78,807,699	52.11	5,619	8,522,995	67.71	154	99,482	28.82	73,284	....	.....	73,284
Aug.	66,217	70,536,735	47.55	4,529	5,805,789	57.23	148	93,807	28.31	70,894	159	290,479	70,735
Sept.	59,309	57,619,906	43.44	1,800	1,838,512	45.59	121	78,427	29.00	61,230	89	45,061	61,141
Oct.	51,850	49,109,610	42.28	3,055	3,499,763	51.15	206	149,590	32.42	55,111	73	120,779	55,038
Nov.	54,561	51,161,914	41.79	2,620	3,251,833	55.42	107	75,370	32.19	57,278	67	96,521	57,211
Dec.	44,332	42,695,894	42.99	860	1,190,609	61.82	171	110,448	28.79	45,363	25	22,732	45,338
1952:													
Jan.	80,561	76,995,564	42.67	2,569	3,299,142	39.95	153	97,922	28.60	83,283	140	207,976	83,143
Feb.	73,781	70,775,631	42.82	2,556	3,016,023	52.66	45	29,061	28.58	76,382	95	120,410	76,287
Mar.	81,577	76,567,896	41.90	3,570	4,149,537	51.88	25	12,701	22.68	85,172	93	127,007	85,079
Apr.	78,098	71,497,007	40.87	4,821	4,402,416	40.77	55	27,927	22.67	82,974	85	103,819	82,889
May	55,764	45,898,163	36.74	3,409	3,140,619	41.12	15	7,644	22.62	59,188	130	150,568	59,058
June	62,744	48,168,471	34.27	4,445	3,934,931	30.62	74	28,985	16.85	67,263	1,555	190,975	65,708
July	45,718	30,026,066	29.32	2,295	2,378,572	33.74	412	153,855	16.66	48,425	135	128,437	48,290

Source: Bureau of the Census, U. S. Department of Commerce. * Adjusted to agree with total gross imports.

Notes: (1) Figures for latex are on a dry weight basis. (2) Figures for re-exports include natural rubber (dry and latex) and guayule. (3) In the years 1940 through 1943, crepe sole rubber imports were reported under a separate classification. Such imports, which are included under natural rubber, dry above, were: 856,294 pounds, valued at $191,097 in 1940; 379,607 pounds, valued at $85,924 in 1941; 662,503 pounds, valued at $159,530 in 1942; and 21,653 pounds, valued at $5,215 in 1943.

Natural Rubber
(Including Latex and Guayule)

(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1936	488,145	575,000	12,581	223,000
1937	600,479	543,600	7,902	262,204
1938	411,983	437,031	5,652	231,500
1939	499,473	592,000	13,125	125,800
1940	818,243	648,500	7,060	288,864
1941	1,029,007	775,000	5,376	533,344
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1947	688,354	562,661	4,101	129,038
1948	735,227	627,332	6,673	141,541
1949	660,792	574,522	6,253	106,619
1950	802,249	720,268	8,644	89,215
1951	733,048	454,015	2,603	76,569
1951:				
June	56,504	39,998	224	68,369
July	73,180	35,478	....	67,816
Aug.	77,338	36,506	158	67,491
Sept.	61,409	36,887	27	56,941
Oct.	55,219	37,407	73	63,501
Nov.	57,108	35,037	67	63,689
Dec.	45,193	33,256	25	76,569
1952:				
Jan.	83,283	36,989	140	75,488
Feb.	76,383	34,841	95	73,959
Mar.	85,172	35,682	93	61,553
Apr.	82,974	36,417	85	59,422
May	59,188	36,437	130	63,988
June	67,246	36,946	156	72,995
July	49,251	32,760	136	84,839
Aug.	67,139	32,678	146	84,299

Source: Rubber Division, NPA, U. S. Department of Commerce.

U.S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.

(All Quantities in Long Tons)

Year	Balata		Jelutong		Gutta-Percha & Other Guttas	
	Tons	Value	Tons	Value	Tons	Value
1936	535	199,368	6,163	1,296,364	1,568	555,643
1937	354	151,344	7,109	2,017,786	1,122	440,894
1938	509	181,140	9,132	2,944,504	444	204,582
1939	694	265,553	6,640	1,603,418	1,740	539,255
1940	648	300,500	7,451	2,449,137	2,340	1,004,885
1941	924	489,514	8,821	2,954,001	1,783	607,025
1942	1,544	1,107,059	1,200	530,296	804	525,763
1943	1,047	708,701	35	14,840	....	.....
1944	1,012	660,805	88	45,578	10	4,999
1945	1,361	907,253	....	.....	36	21,970
1946	2,281	2,233,065	304	256,169	423	458,064
1947	1,982	2,276,531	2,878	1,496,887	392	779,591
1948	1,195	805,078	3,401	2,377,765	423	542,788
1949	1,391	814,554	1,043	834,978	197	189,021
1950	2,117	1,589,885	1,789	1,515,162	541	745,418
1951	2,452	1,973,271	1,669	2,608,359	383	430,539
1951:						
May	306	200,459	130	194,904	26	22,515
June	227	153,222	151	250,828	72	63,998
July	115	94,073	193	308,222	23	32,106
Aug.	121	136,723	142	224,194	8	7,060
Sept.	307	227,392	62	105,395	12	14,660
Oct.	368	383,056	138	241,246	5	6,175
Nov.	148	123,442	167	270,242	33	26,011
Dec.	96	113,773	52	99,761	8	23,467
1952:						
Jan.	126	95,203	204	375,802	27	59,439
Feb.	31	23,118	15	211,229	10	33,474
Mar.	50	43,207	128	217,096	27	43,861
Apr.	49	31,239	234	409,076	32	41,391
May	57	32,488	92	141,257	26	27,853
June	57	31,787	212	273,357	50	50,941
July	55	35,941	100	148,350	16	18,422

Source: U. S. Department of Commerce.

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Synthetic Rubber—Totals

(GR-S, Neoprene, Butyl, and Buna N Types)

(All Quantities in Long Tons)

Year	Production	Imports	Consumption	Exports	Stocks On Hand at End of Period
1941	8,383	.....	6,259	572	1,702
1942	22,434	.....	17,651	1,419	4,612
1943	231,722	.....	170,891	18,148	41,568
1944	762,630	11,043	566,670	104,266	142,927
1945	820,373	10,407	693,580	83,778	203,454
1946	740,026	7,709	761,699	72,920	114,963
1947	508,702	1,093	559,566	11,385	62,366
1948	488,343	15,671	442,072	4,874	115,111
1949	393,690	17,242	414,381	6,483	98,042
1950	476,184	25,722	538,289	7,652	52,758
1951	845,155	10,085	758,897	9,249	129,420
1952:					
Apr.	77,437	1,320	68,492	2,415	159,701
May	61,368	1,592	67,339	2,350	154,339
June	64,040	2,293	66,203	1,154	151,324
July	58,992	1,456	58,642	1,499	152,373
Aug.	59,214	1,612	60,998	....	150,248

Source: U. S. Department of Commerce.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures shown include the output of both government and privately-owned plants. (3) Figures for 1941 are estimated.

Synthetic Rubber—By Type

(All Quantities in Long Tons)

New Supply

	GR-S (Buna S)	GR-M (Neoprene)	GR-I (Butyl)	Buna N Types	Total
1944	679,949	56,660	20,252	16,812	773,673
1945	724,859	45,672	52,378	7,871	830,780
1946	613,408	47,766	80,823	5,738	747,735
1947	408,858	31,495	62,824	6,618	509,795
1948	405,492	34,848	56,662	7,012	504,014
1949	310,599	35,215	54,046	11,072	410,932
1950	378,887	50,067	60,915	12,037	501,906
1951	704,525	58,907	76,475	15,333	855,240

Consumption

1944	495,552	46,243	10,763	14,112	566,670
1945	600,145	42,394	43,012	8,029	693,580
1946	632,126	44,357	79,228	5,988	761,699
1947	448,589	37,703	68,838	4,536	559,666
1948	345,313	32,118	58,870	5,771	442,072
1949	299,420	31,753	50,855	8,827	414,381
1950	416,230	43,781	66,348	11,930	538,289
1951	626,444	48,887	70,500	13,066	758,897

Exports

1944	98,380	4,799	530	557	104,266
1945	76,555	5,837	980	406	83,778
1946	68,763	2,642	495	797	72,697
1947	7,951	2,617	62	755	11,385
1948	1,093	2,875	21	885	4,874
1949	1,401	3,330	178	1,574	6,483
1950	900	4,826	31	1,895	7,652
1951	483	6,825	216	1,725	9,249

Stocks at End of Period

1944	116,130	11,739	9,892	5,166	142,927
1945	170,571	9,703	18,378	4,802	203,454
1946	81,483	10,470	19,478	3,755	115,186
1947	40,606	5,237	13,184	3,339	62,366
1948	96,282	5,072	10,995	2,762	115,111
1949	77,731	4,654	12,224	3,433	98,042
1950	36,942	5,733	7,243	2,840	52,758
1951	105,271	8,379	12,481	3,289	129,420

Source: U. S. Department of Commerce.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures for GR-M and Buna N Types include production of privately-owned plants.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1945	1946	1947	1948	1949	1950	1951	1952
Jan.	52,008	51,746	57,057	61,308	63,125	66,981	80,554	86,863
Feb.	48,856	47,654	50,551	56,487	57,980	63,274	72,717	82,043
Mar.	55,364	56,703	59,947	68,171	73,282	78,780	86,486	87,065
Apr.	59,024	62,111	64,140	72,183	75,318	80,350	87,430	98,653
May	60,748	66,800	70,865	77,186	81,665	89,035	100,188	101,137
June	60,580	63,247	71,329	78,044	83,374	90,174	96,093	99,305
July	66,170	60,076	73,441	81,428	82,129	91,677	100,476	105,307
Aug.	70,058	66,729	72,089	80,351	84,707	94,507	101,206	102,954
Sept.	64,529	62,268	71,384	76,159	80,832	86,725	91,803	.....
Oct.	55,708	66,637	73,277	75,164	79,327	89,067	99,945	.....
Nov.	53,543	61,345	64,158	72,560	76,346	82,688	88,702	.....
Dec.	49,745	61,101	67,506	72,162	75,628	81,032	84,394	.....
Total	696,333	735,417	795,015	871,270	913,713	994,290	1,090,354	.....

Source: U. S. Bureau of Mines.

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude [a]	Exports	Stocks On Hand at End of Period
1936	150,571	141,486	24.6	7,085	19,000
1937	185,033	162,000	29.8	13,233	28,800
1938	122,400	120,800	27.6	7,403	23,000
1939	186,000	170,000	28.7	12,611	25,250
1940	208,971	190,244	29.3	11,347	32,636
1941	274,202	251,231	32.2	13,851	41,750
1942	286,007 [b]	254,820	64.6	30,405	42,532
1943	304,058 [c]	291,082	59.6	15,678	46,201
1944	260,631 [d]	251,083	35.3	11,800	43,832
1945	243,309	241,036	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1947	291,395	288,395	24.8	14,556	35,943
1948	266,861	261,113	24.4	11,428	32,630
1949	224,029	226,679	22.5	10,637	28,263
1950	314,008	303,733	24.1	11,740	35,708
1951	366,700	346,121	28.5	14,722	45,082
1952:					
Jan.	27,855	26,553	24.9	958	45,067
Feb.	23,953	24,518	24.4	841	43,306
Mar.	22,833	24,797	23.8	1,054	40,579
Apr.	24,034	23,911	23.0	1,070	39,767
May	23,267	22,314	21.7	1,078	40,169
June	21,179	21,850	21.2	903	38,973
July	16,338	18,354	20.1	725	36,287
Aug.	17,367	20,447	21.8	819	31,931

Source: U. S. Department of Commerce.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. [a] Includes natural and synthetic rubber. [b] Includes 893 tons of imports. [c] Includes 67 tons of imports. [d] Includes 21 tons of imports.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total	Year	Passenger Cars	Trucks	Total
1932	1,135,491	235,187	1,370,678	1942	220,814	133,083	353,897
1933	1,573,512	346,545	1,920,057	1943	0	4,501	4,501
1934	2,177,919	575,192	2,753,111	1944	0	124,819	124,819
1935	3,252,244	694,690	3,946,934	1945	83,792	313,643	397,435
1936	3,669,528	781,862	4,451,390	1946	2,148,699	930,760	3,079,459
1937	3,915,889	892,382	4,808,271	1947	3,558,178	1,220,634	4,778,812
1938	2,000,985	485,852	2,486,837	1948	3,909,270	1,363,856	5,273,126
1939	2,866,796	704,308	3,571,104	1949	5,108,841	1,123,736	6,232,577
1940	3,692,328	721,637	4,413,965	1950	6,665,836	1,332,263	7,998,099
1941	3,744,500	875,381	4,619,681	1951	5,337,729	1,420,432	6,758,161
1951:							
Jan.	478,589	127,583	606,172	July	381,407	110,244	481,651
Feb.	505,865	111,935	617,800	Aug.	426,932	121,993	548,925
Mar.	617,399	136,794	754,193	Sept.	365,906	109,353	475,259
Apr.	503,038	135,415	638,453	Oct.	414,533	110,740	525,273
May	511,938	140,047	651,985	Nov.	356,788	93,179	449,967
June	482,029	134,818	616,847	Dec.	293,305	17,481	310,786
1952:							
Jan.	273,639	100,993	374,632	July	168,327	43,231	211,558
Feb.	334,058	100,533	434,591	Aug.	218,577	52,056	270,633
Mar.	373,237	109,167	482,404	Sept.	.....	.....	.....
Apr.	416,155	112,833	528,988	Oct.	.....	.....	.....
May	398,286	105,208	503,494	Nov.	.....	.....	.....
June	408,700	109,526	518,226	Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.

Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Rim Production

	1947	1948	1949	1950	1951
Passenger Car	21,346,004	23,842,796	27,715,344	35,096,404	29,146,048
Truck & Bus	7,737,353	6,920,231	4,238,174	6,625,129	6,877,419
Agricultural	2,633,699	3,140,882	2,695,430	2,853,483	3,019,581
Earth Mover	10,610	13,330	9,895	15,602	28,026
Total	31,727,666	33,917,239	34,658,843	44,590,618	39,071,074

	1952 Apr.	May	June	July	Aug.	Sept.
Passenger Car	2,375,344	2,176,901	1,928,280	708,328	1,589,252	2,964,901
Truck & Bus	533,865	637,083	386,759	58,955	395,190	514,833
Agricultural	188,335	253,732	165,345	43,821	147,512	182,075
Earth Mover	2,495	456	1,753	494	712	538
Total	3,120,039	3,068,172	2,482,137	812,598	2,132,666	3,662,347

Source: The Tire & Rim Association, Inc.

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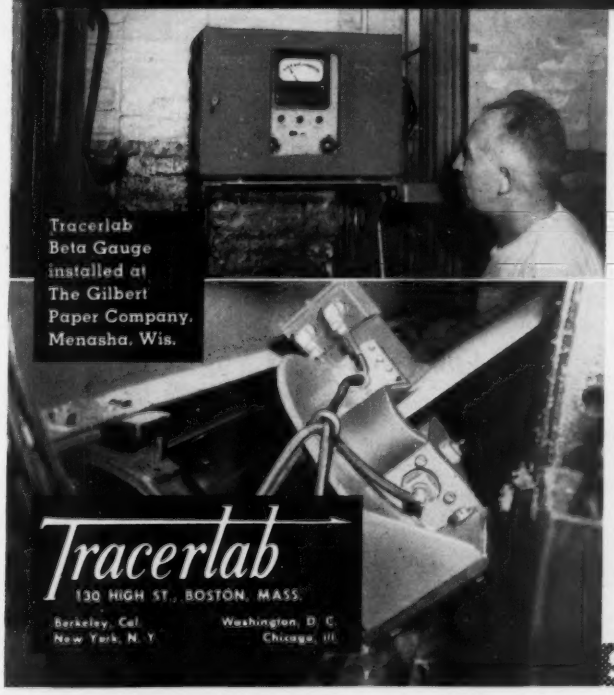

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Automotive Pneumatic Casings

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1939 (total)	18,208	38,022	1,279	57,509	57,613	8,665
Passenger Car.	15,742	33,471	607	49,820	49,933	7,108
Truck and Bus	2,466	4,551	672	7,689	7,680	1,557
1940 (total)	22,252	35,346	1,176	58,774	59,186	9,127
Passenger Car.	19,560	30,903	411	50,874	50,965	7,270
Truck and Bus	2,692	4,443	765	7,900	8,221	1,857
1941 (total)	24,780	39,895	1,489	66,164	61,540	4,436
Passenger Car.	19,855	34,119	586	54,560	50,392	3,165
Truck and Bus	4,925	5,776	903	11,604	11,148	1,271
1942 (total)	6,680	8,872	207	15,759	15,351	6,247
Passenger Car.	910	2,734	38	3,682	2,790	4,432
Truck and Bus	5,770	6,138	169	12,077	12,561	1,815
1943 (total)	6,128	18,547	225	24,900	20,423	1,883
Passenger Car.	82	10,606	71	10,759	7,620	1,132
Truck and Bus	6,046	7,941	154	14,141	12,803	751
1944 (total)	6,654	26,439	263	33,356	33,446	2,013
Passenger Car.	208	18,330	130	18,668	18,819	1,218
Truck and Bus	6,446	8,109	133	14,688	14,627	795
1945 (total)	5,984	36,479	504	42,967	44,524	3,077
Passenger Car.	1,115	25,463	222	26,800	28,200	2,214
Truck and Bus	4,869	11,016	282	16,167	16,324	863
1946 (total)	15,310	65,490	1,512	82,312	82,298	2,448
Passenger Car.	11,086	54,684	653	66,423	66,466	1,763
Truck and Bus	4,224	10,806	859	15,889	15,832	685
1947 (total)	25,056	62,871	3,256	91,183	95,550	6,949
Passenger Car.	19,644	52,857	1,608	74,109	77,795	5,444
Truck and Bus	5,412	10,014	1,648	17,074	17,755	1,505
1948 (total)	26,845	49,148	1,787	77,781	81,314	10,698
Passenger Car.	21,589	41,295	656	63,540	66,738	8,773
Truck and Bus	5,256	7,853	1,132	14,241	14,576	1,925
1949 (total)	31,584	43,466	1,467	76,517	76,369	10,638
Passenger Car.	28,129	36,440	509	65,077	65,140	8,904
Truck and Bus	3,456	7,026	958	11,440	11,228	1,734
1950 (total)	41,349	56,808	1,430	99,587	92,754	3,794
Passenger Car.	36,678	47,103	642	84,423	78,598	3,050
Truck and Bus	4,671	9,705	788	15,164	14,156	743
1951 (total)	32,153	44,612	1,677	78,442	83,405	8,765
Passenger Car.	26,729	34,226	723	61,678	65,546	6,973
Truck and Bus	5,424	10,386	954	16,764	17,859	1,791
1952:						
June (total)	2,617	6,256	130	9,003	7,367	11,668
Passenger Car.	2,191	5,569	75	7,834	6,067	8,650
Truck and Bus	426	687	55	1,169	1,300	3,018
July (total)	1,186	5,845	117	7,148	7,097	11,647
Passenger Car.	986	5,058	72	6,116	5,978	8,545
Truck and Bus	200	787	45	1,032	1,119	3,102
Aug. (total)	1,632	6,226	131	7,989	6,933	10,637
Passenger Car.	1,312	5,336	85	6,732	5,927	7,785
Truck and Bus	320	890	47	1,257	1,006	2,852

Source: The Rubber Manufacturers Association, Inc.

Cotton, Rayon and Nylon Tire Fabrics

(Production in Thousands of Pounds)

	Cotton				Rayon and Nylon[b]		
	Tire Cord Not Woven	Cord Fabric Woven	Chafer and All Other Tire Fabrics	Total	Tire Cord Not Woven	Tire Cord And Other Tire Fabrics	Total
1948:							
Jan.-Mar.	18,546	50,251	19,391	88,188	a	60,569	60,569
Apr.-June	15,585	45,385	18,213	79,183	a	59,759	59,759
July-Sept.	29,743	45,927	c	75,670	a	63,642	63,642
Oct.-Dec.	13,321	34,424	15,879	63,624	a	65,258	65,258
Total	77,195	175,987	53,483	306,665	.....	249,228	249,228
1949:							
Jan.-Mar.	d	33,213	25,395	56,608	a	68,296	68,926
Apr.-June	5,309	29,114	13,617	48,040	a	68,269	68,269
July-Sept.	1,343	16,620	11,141	29,104	15,640	55,969	71,609
Oct.-Dec.	180	17,650	11,886	29,716	12,967	58,890	72,857
Total	6,832	96,597	62,039	163,468	28,607	251,424	281,661
1950:							
Jan.-Mar.	3,939	19,210	12,948	36,097	12,469	60,981	73,450
Apr.-June	11,077	29,498	14,071	54,646	11,510	59,966	71,476
July-Sept.	10,529	39,792	15,101	65,152	13,161	61,614	74,775
Oct.-Dec.	13,314	37,759	14,405	65,578	12,942	63,399	76,341
Total	38,859	126,259	56,525	221,473	50,082	245,960	296,476
1951:							
Jan.-Mar.	11,497	38,269	16,737	66,503	11,878	65,512	77,390
Apr.-June	12,608	42,491	17,055	72,154	11,979	61,957	73,936
July-Sept.	16,744	44,340	17,433	78,517	12,091	67,982	80,073
Oct.-Dec.	14,237	43,820	13,899	71,956	a	83,354	83,354
Total	55,116	168,920	65,124	289,160	35,948	278,805	314,753

Source: U. S. Bureau of the Census.

Notes: (a) Included with tire cord and fabrics to avoid disclosures of operations of individual mills. (b) Fuel cell fabrics are not included with rayon and nylon tire cord and fabrics. (c) Included with tire cord not woven. (d) Included with chafer and all other tire fabrics.

Automotive Inner Tubes

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1940	22,172	29,070	972	52,214	52,237	7,017
1941	24,722	33,749	1,232	59,703	57,433	4,686
1942	6,895	7,213	159	14,267	12,685	6,206
1943	6,350	12,474	189	19,014	15,014	2,626
1944	6,460	20,569	196	27,224	27,488	2,813
1945	5,988	33,906	411	40,304	41,742	3,627
1946	15,327	59,357	1,424	76,108	77,251	3,820
1947	25,046	46,560	2,483	74,088	79,181	8,059
1948	26,833	40,548	1,119	68,499	70,033	9,641
1949	31,521	31,450	887	63,858	65,114	10,657
1950	41,240	42,671	811	84,723	80,179	....
1951	32,151	32,284	1,071	65,507	67,249	10,094
1952:						
May	2,718	2,548	63	5,330	5,771	11,493
June	2,610	3,323	107	6,040	5,536	10,974
July	1,185	3,228	94	4,507	4,790	11,223
Aug.	1,638	3,706	86	5,431	4,867	10,627

Source: The Rubber Manufacturers Association, Inc.

Smoked Sheets—Spot Closing Prices

(New York Market—Cents per Pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1910	288	141	206.60	1931	8⅝	4⅛	6.17
1911	184	114	141.30	1932	4¾	2½	3.49
1912	140	108	121.60	1933	9⅞	2⅛	5.96
1913	113	59	82.04	1934	15⅞	8¾	12.92
1914	93	56	65.33	1935	13¾	10½	12.37
1915	79	58½	65.85	1936	23	13½	16.41
1916	102	55	72.50	1937	26⅛	14	19.39
1917	90	52	72.23	1938	17⅞	10¼	14.64
1918	70	40	60.15	1939	24	14⅛	17.57
1919	57	38½	48.70	1940	24	18¼	20.10
1920	56½	16	36.30	1941	24⅞	19⅛	22.40
1921	21¼	11½	16.36	1942	22½	22⅛	22.50
1922	28¼	13⅝	17.50	1943	22½	22⅛	22.50
1923	37½	24¾	29.45	1944	22½	22⅛	22.50
1924	40⅛	17⅝	26.20	1945	22½	22⅛	22.50
1925	121	34¾	72.46	1946	22½	22⅛	22.50
1926	88½	36¾	48.50	1947	25	14	20.00
1927	41¾	33	37.72	1948	25	18	21.99
1928	41¼	17	22.48	1949	19¾	15⅞	17.57
1929	26⅞	15½	20.55	1950	86	18	41.10
1930	16½	7½	11.98	1951	76	52	(a)

Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947. (a) Free trading suspended March 31, 1951. GSA selling price ranged between 52 and 66c during balance of year.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1945	1946	1947	1948	1949	1950	1951	1952
Jan.	22.36	25.49	32.58	36.09	33.37	31.89	45.04	42.96
Feb.	22.29	26.57	33.91	33.63	33.41	32.79	(a)	41.64
Mar.	22.43	27.52	35.89	35.04	33.44	32.65	46.06	41.70
Apr.	21.88	28.40	35.89	38.10	33.84	33.23	46.06	41.79
May	23.30	28.17	36.51	38.57	33.73	33.64	46.06	39.68
June	23.42	29.89	37.83	38.12	33.56	34.61	46.06	41.31
July	23.27	34.11	38.03	34.89	32.99	38.11	41.21	40.37
Aug.	23.10	36.31	34.83	32.23	32.06	38.93	35.93	40.42
Sept.	23.25	37.59	32.21	31.92	30.94	41.62	36.20	39.75
Oct.	23.85	36.79	32.39	32.01	30.32	40.66	38.13	37.52
Nov.	24.71	31.50	34.50	32.15	30.52	43.11	42.70	....
Dec.	25.21	33.03	36.74	32.90	31.08	43.37	43.32	....
Average for Year	23.25	31.28	35.11	34.64	32.44	37.05	42.43	....

Note: The Government established a ceiling price of 45.76c for spot cotton on March 3, 1951. (a) Trading suspended during February.

Consumption of Vinyl Resins

(In Thousands of Pounds)

	Sheeting and Film[a]	Textile and Paper Coating Resins	Molding and Extrusion Materials	All Other
1948	98,021	31,085	73,598	21,147
1949	157,544	29,470	81,842	19,792
1950	227,149	46,044	113,889	21,868
1951	161,547	43,688	134,890	23,934
1952:				
Apr.	12,484	3,490	11,993	1,963
May	11,993	3,388	9,289	2,273
June	10,015	3,303	8,739	2,174
July	10,504	2,980	8,298	2,295

Source: U. S. Tariff Commission.

Note: (a) Includes weight of fillers, plasticizers, extenders and safety glass sheeting. Beginning January, 1951, statistics are listed on a resin content basis.

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STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION of RUBBER AGE, published Monthly at East Stroudsburg, Penna., for October 1, 1952.

1. The names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, Palmerton Publishing Company, Inc., 250 West 57th St., New York 19, N. Y.; Editor, M. E. Lerner, 250 West 57th St., New York 19, N. Y.; Managing Editor, None; Business Manager, Peter P. Pinto, 250 West 57th St., New York 19, N. Y.

2. The owner is (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

Palmerton Publishing Company, Inc., 250 West 57th St., New York 19, N. Y.; P. L. Palmerton, 250 West 57th St., New York 19, N. Y.; Peter P. Pinto, 250 West 57th St., New York 19, N. Y.; M. E. Lerner, 250 West 57th St., New York 19, N. Y.; C. T. Jansen, 250 West 57th St., New York 19, N. Y.; E. D. Osborn, 149 East 73rd St., New York 21, N. Y.; Hildegard E. Palmerton, 56 Vassar Place, Rockville Center, N. Y.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are:

None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

PETER P. PINTO, Business Manager.

Sworn to and subscribed before me this 24th day of September, 1952.
(SEAL) HERMAN CASAROFF, Notary Public.
(My commission expires March 30, 1953)

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Rubber Industry Employment, Wages and Hours

All Rubber Products

	1951				1952			
Mo.	Production Workers (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Production Workers (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
Jan.	222	$66.78	40.4	$1.653	218	$74.19	40.9	$1.814
Feb.	222	63.37	38.9	1.629	215	73.31	40.5	1.810
Mar.	220	65.88	40.0	1.647	215	72.58	40.3	1.801
Apr.	219	65.96	40.0	1.649	213	71.40	39.6	1.803
May	220	68.56	41.3	1.660	213	73.47	40.5	1.814
June	220	71.27	41.9	1.701	215	75.30	41.1	1.832
July	217	70.81	41.0	1.727	200	73.71	40.3	1.829
Aug.	218	69.52	40.7	1.708	207	....	....	....
Sept.	218	70.18	40.9	1.716	....	....	....	....
Oct.	215	68.67	40.3	1.704	....	....	....	....
Nov.	219	69.46	40.5	1.715	....	....	....	....
Dec.	219	73.91	41.2	1.794	....	....	....	....

Tires and Tubes

Jan.	91.3	73.69	38.4	1.919	94.4	86.99	40.9	2.127
Feb.	90.6	66.95	35.5	1.886	94.2	85.75	40.6	2.112
Mar.	88.3	71.40	37.6	1.899	93.9	83.46	39.8	2.097
Apr.	87.4	70.15	37.0	1.896	94.6	81.90	39.3	2.084
May	88.3	75.92	39.4	1.927	94.6	84.96	40.4	2.103
June	89.9	82.44	41.7	1.977	95.2	88.22	41.4	2.131
July	90.0	83.67	41.4	2.021	92.8	87.11	40.8	2.135
Aug.	91.5	82.07	41.2	1.992	....	....	....	....
Sept.	92.4	81.64	40.9	1.996	....	....	....	....
Oct.	89.8	78.76	39.9	1.974	....	....	....	....
Nov.	94.8	80.27	40.5	1.982	....	....	....	....
Dec.	95.4	86.26	41.0	2.104	....	....	....	....

Rubber Footwear

Jan.	24.9	57.53	41.6	1.383	25.4	60.27	40.1	1.503
Feb.	25.3	55.87	40.6	1.376	24.7	60.46	39.8	1.519
Mar.	25.0	58.17	41.4	1.405	24.2	61.51	40.2	1.530
Apr.	24.8	59.82	42.1	1.421	22.0	59.42	39.3	1.512
May	25.4	61.48	42.9	1.433	23.5	60.69	39.9	1.521
June	25.7	59.98	42.3	1.418	23.7	61.35	40.2	1.526
July	24.8	54.68	39.0	1.402	18.6	58.19	39.0	1.492
Aug.	25.2	57.04	40.8	1.398	....	....	....	....
Sept.	25.3	55.94	40.1	1.395	....	....	....	....
Oct.	25.5	56.76	40.0	1.404	....	....	....	....
Nov.	25.6	56.64	40.2	1.409	....	....	....	....
Dec.	25.5	59.95	40.7	1.473	....	....	....	....

All Other Rubber Products

Jan.	105.8	63.06	41.9	1.505	97.9	65.63	41.2	1.593
Feb.	106.3	61.95	41.3	1.500	96.3	64.43	40.6	1.587
Mar.	106.3	63.13	41.7	1.514	97.2	64.83	40.8	1.589
Apr.	106.3	63.81	41.9	1.523	96.3	63.68	39.9	1.596
May	106.0	64.09	42.5	1.508	95.0	65.32	40.8	1.601
June	104.7	64.47	42.0	1.535	95.7	65.81	41.0	1.605
July	102.2	63.29	41.1	1.540	89.0	62.88	40.0	1.572
Aug.	101.2	61.42	40.3	1.524	....	....	....	....
Sept.	100.2	63.06	41.0	1.538	....	....	....	....
Oct.	99.4	62.68	40.7	1.540	....	....	....	....
Nov.	98.2	62.36	40.6	1.536	....	....	....	....
Dec.	97.9	65.45	41.5	1.577	....	....	....	....

Source: U. S. Department of Commerce and Labor.

Note: Data are based upon reports from cooperating establishments covering both full and part-time employees who worked during or received pay for the pay period ending nearest the 15th of the month. The employment series have been adjusted to levels indicated by Federal Security Agency data for 1947, and have been carried forward from 1947 bench-mark levels, thereby providing consistent series. Hours and earning data pertain only to production and related workers.

Production Index for the Rubber Industry

Production 1935-1939 = 100

(Based on man-hours)

	1950	1951	1952		1950	1951	1952
Jan.	194	244	248	July	222	243	227
Feb.	195	235	243	Aug.	236	243	240
Mar.	197	239	242	Sept.	244	245	....
Apr.	203	238	235	Oct.	250	239	....
May	213	247	242	Nov.	250	245	....
June	221	251	247	Dec.	251	250	....

Source: U. S. Department of Commerce.

Sales by the Rubber Industry

(In Millions of Dollars)

	1950	1951	1952		1950	1951	1952
Jan.	265	454	468	July	454	438	408
Feb.	273	434	442	Aug.	457	467	....
Mar.	293	459	406	Sept.	404	435	....
Apr.	288	439	437	Oct.	405	445	....
May	321	432	424	Nov.	397	438	....
June	350	433	430	Dec.	424	363	....

Source: U. S. Department of Commerce.

Rubber Manufacturers' Inventories

(Based upon Book-Value)

(In Millions of Dollars)

	1950	1951	1952		1950	1951	1952
Jan.	524	562	840	July	501	616	884
Feb.	526	555	848	Aug.	483	640	....
Mar.	532	554	865	Sept.	502	659	....
Apr.	536	565	877	Oct.	524	705	....
May	540	583	878	Nov.	564	739	....
June	544	610	864	Dec.	549	799	....

Source: U. S. Department of Commerce.

Various Compounding Materials Consumed by the Rubber Industry

Material	1945	1946	1947	1948	1949	1950	1951
Antimony, Primary:							
Short tons	.....	.....	39	41	55	103 [c]	19 [c]
% of total	.....	.....	.002	.003	.005	.007	.001
Asphalt: [a]							
Short tons	19,483	28,715	32,113	19,967	18,050	26,819	21,414
% of total	.005	.007	.007	.004	.003	.003	.003
Barite (Barytes):							
Short tons	10,000	20,000	17,000	18,000	14,000	19,000	15,000
% of total	2.1	4.4	3.1	2.85	2.53	3.31	2.13
Carbon Black:							
Short tons	402,193	470,732	471,790	435,282	383,565	515,184	530,614
% of total	95.5	95.3	94.3	95.5	93.3	92.9	92.9
Clay, Kaolin:							
Short tons	109,936	162,393	166,201	176,965	197,341	263,306	231,331
% of total	11.7	12.3	11.5	11.3	13.1	15.0	12.7
Clay, Fire & Stoneware:							
Short tons	7,800	12,951	17,970	15,480	27,148	9,500	.....
% of total	0.1	0.2	0.2	0.2	0.3	0.1	.....
Lime:							
Short tons	7,170	3,193	589	1,154	715	908	.....
% of total	0.12	0.05	0.01	0.02	.0002	.0002	.....
Litharge:							
Short tons	1,864	2,131	2,205	2,835	1,398	3,047	2,641
% of total	1.3	1.6	1.3	1.8	1.2	1.7	1.7
Lithopone:							
Short tons	977	1,607	3,085	4,192	3,245	4,092	3,295
% of total	0.7	1.1	1.9	3.0	4.1	3.9	3.2
Mica, Ground:							
Short tons	3,715	4,951	3,900	4,372	3,856	5,776	6,551
% of total	7.1	8.0	6.0	7.0	7.0	8.0	9.0
Sulfur:							
Short tons	64,960	72,800	72,800	70,560	59,360	.....	.....
% of total	2.0	2.2	1.8	1.7	1.5	.....	.....
Talc: [b]							
Short tons	63,758*	65,980	71,840	66,226	53,414	75,900	70,000
% of total	16.0	14.4	13.9	13.0	12.0	12.0	11.2
Zinc Oxide:							
Short tons	63,447	83,776	82,248	82,895	58,496	82,944	71,507
% of total	49.6	53.1	51.2	54.9	52.5	51.6	48.5

Source: U. S. Bureau of Mines.

Notes: [a] Solid and semi-solid products of less than 200 penetration. [b] Includes prophyllite and ground soapstone. [c] Does not include precipitated antimony sulfide as in previous years. * Revised.

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EXECUTIVE—RUBBER—CHEMICAL ENGINEER desires to relocate. Proven factory manager and technical director. Over twenty years experience management, selling, research and development compounding, production, engineering design and costing of mechanical and chemical blown sponge rubber. Experience includes molded and extruded, special engineered mechanicals, drug sundries and automotive sponge and mechanical parts. Consulting and Manufacturers Agent proposals will be given careful consideration. Address Box 495-P, RUBBER AGE.

TECHNICAL SALES. Broad background rubber and vinyl compounding. Desire technical service position. Well acquainted with trade. Will travel or relocate. Resume on request. Address Box 501-P, RUBBER AGE.

NEW ENGLAND JOB WANTED, by Rubber Chemist. Research-technical service. Address Box 525-P, RUBBER AGE.

EXECUTIVE SALES ENGINEER, 15 years successful experience, production and sales of Rubber Belting, Hose, Custom Molded and Covered Products, desires management connection with aggressive manufacturer. Address Box 527-P, RUBBER AGE.

DESIRE POSITION WITH OPPORTUNITY. Excellent varied experience as rubber chemist, laboratory and plant; management small business, product promotion, advertising planning, personnel supervision. Prefer coastal location, warm climate. Will travel anywhere. Address Box 531-P, RUBBER AGE.

LATEX CHEMIST: with ten years experience in compounding, dipping and coating. Is interested particularly in latex research and development work. Address Box 537-P, RUBBER AGE.

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RUBBER CHEMIST—New England manufacturer of rubber footwear has an opening for a rubber chemist, experienced in development and manufacturing. Must have complete knowledge of formulating compounds, factory processing and laboratory control. Write giving detailed resume, salary expected. Our staff has knowledge of this ad. Address Box 512-W, RUBBER AGE.

HELP WANTED—Continued

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WANTED—COST ESTIMATOR. Progressive Manufacturer, Molded and Extruded goods. 70 miles Detroit. 350 employees. This is a real opportunity to grow with us. Address Box 526-W, RUBBER AGE.

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HELP WANTED—Continued

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ORGANIC CHEMIST—Laboratory connected with chemical and rubber manufacture, Akron, Ohio area, has opening for man with research experience in synthesis of accelerators and antioxidants and knowledge of the basis compounding of rubber. Good opportunity, excellent salary for qualified man. Give complete information, including present and desired salary. Application strictly confidential. Address Box 528-W, RUBBER AGE.

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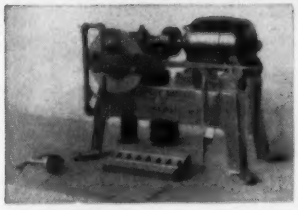

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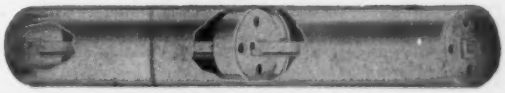

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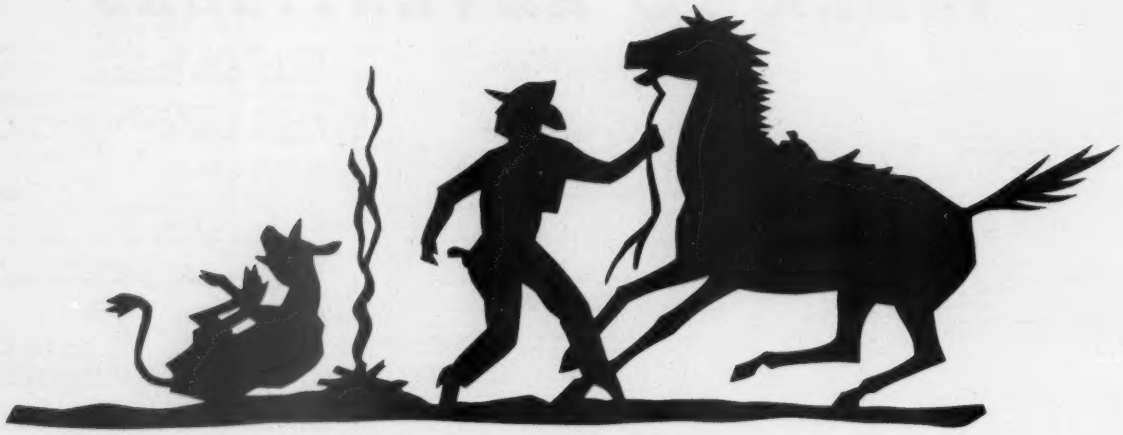

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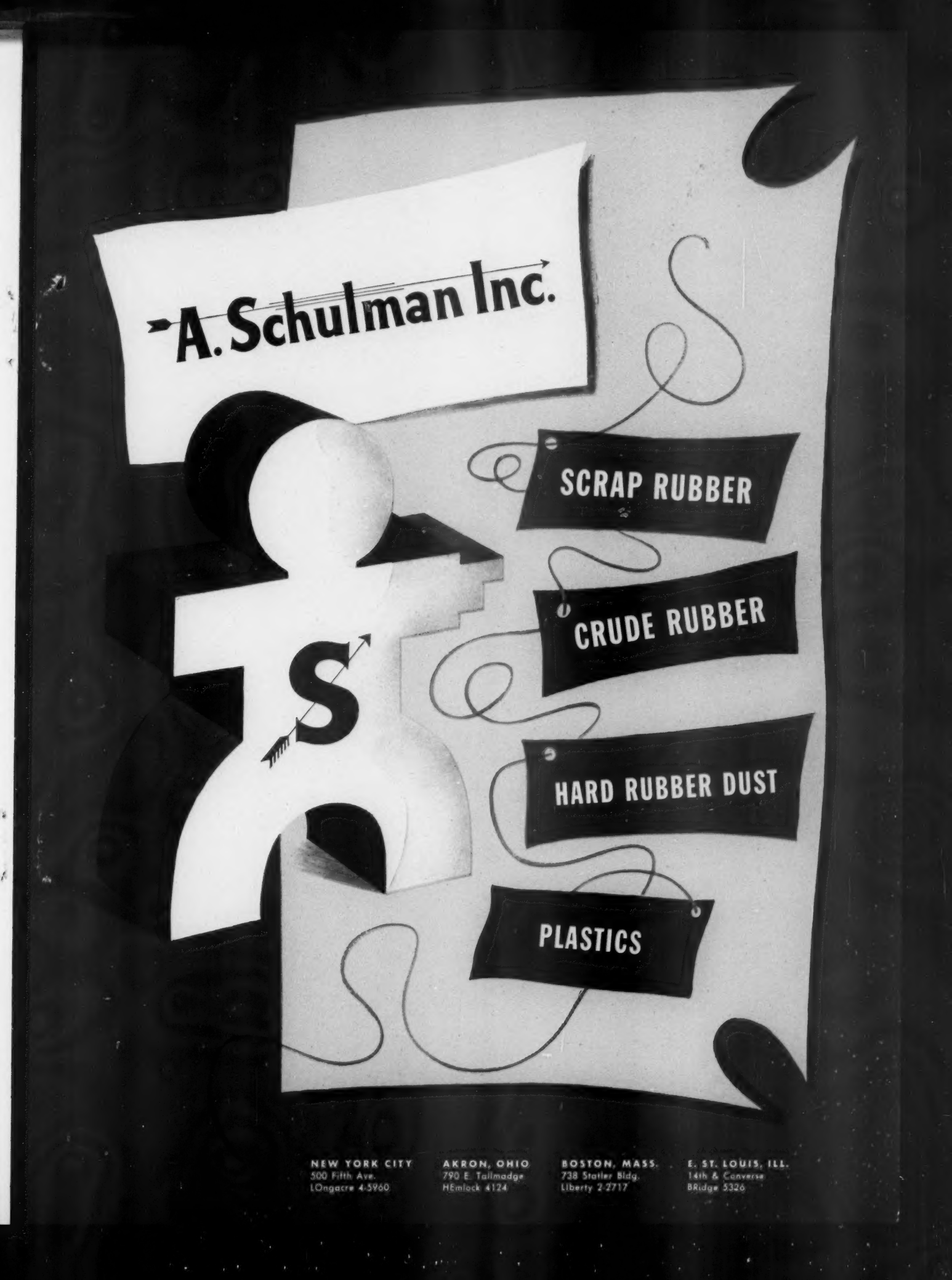
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